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THE METAL INDUSTRY

WITH WHICH ARE INCORPORATED
THE ALUMINUM WORLD: COPPER AND BRASS: THE BRASS FOUNDER AND FINISHER
ELECTRO-PLATERS REVIEW

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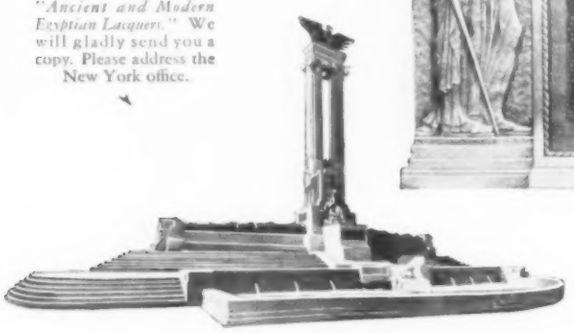
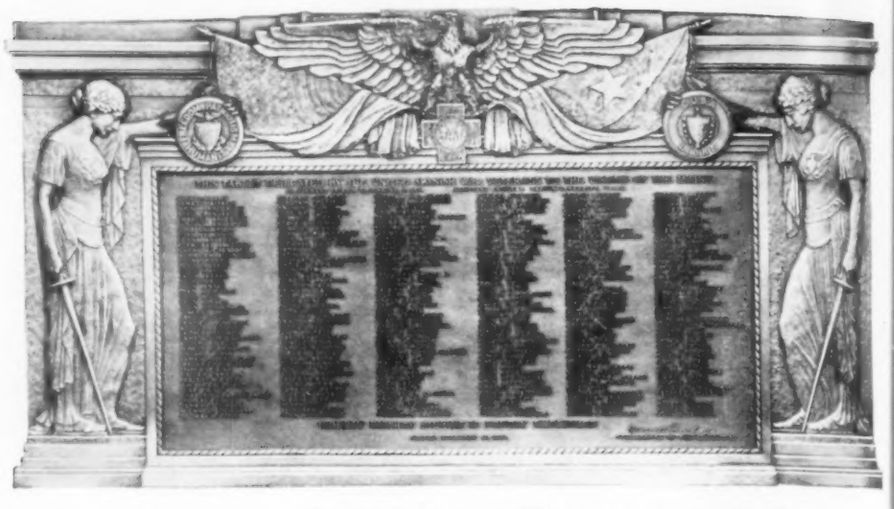
Contents Text Page 297

Buyers' Guide Advertising Page 85

The maker who is proud of what he makes, uses Egyptian Lacquer

There is unusual charm and interest in a new booklet we have prepared *"Ancient and Modern Egyptian Lacquers."* We will gladly send you a copy. Please address the New York office.





Memorial shaft in Havana which commemorates the sinking of the Maine. The bronze tablet, designed and executed by W. S. Tyler Company and finished with transparent Egyptian Lacquer, is regarded as one of the finest bronzes ever made. In the recent hurricane in Cuba, the monument was damaged but the finish remained unharmed!

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EGYPTIAN Lacquers

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Vol. 25 NEW YORK, JULY, 1927 No. 7

American Foundrymen's Convention

A Report of the Twenty-First Annual Convention Held in Chicago, Ill., June 6-10, 1927

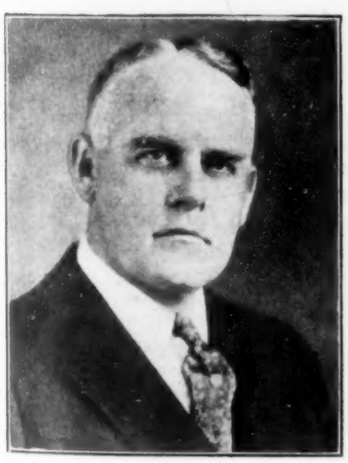
Written for The Metal Industry by H. M. ST. JOHN, Chief Metallurgist, Detroit Lubricator Company, Detroit, Mich.

The twenty-first annual convention of the American Foundrymen's Association, held in Chicago, Ill., June 6-10, marked a new step in the history of that organization. Only seven months had intervened since the last meeting in Detroit. There was no exhibition of foundry equipment and supplies to attract the interest of the practical foundryman. For these reasons it has been thought that the interest in the meeting might be rather scant and the attendance small. Quite the contrary proved to be true. Nearly fifteen hundred members and guests were registered, not counting the ladies. Nearly everyone stayed throughout the entire period of the convention. The papers were of a high standard and attendance at the technical sessions was unusually large and enthusiastic.

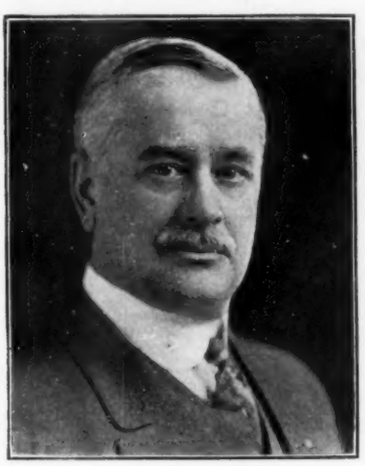
It is worthy of note that the technical sessions were much better attended and the discussion of papers more general than has commonly been the case at past meetings held in conjunction with exhibitions of equipment. It is rather apparent that these meetings have sometimes suffered as a result of a divided interest on the part of members who wished to cover as thoroughly as possible both the meetings and the exhibitions.

Monday, June 6th, the first day of the gathering, was given up to plant visitation and meetings of the various committees of the Association. The number and scop- of these committees have grown to such an extent that, in order to avoid serious conflicts of interest, it is practically necessary to set aside one day of the convention for their exclusive use.

At the general opening meeting on Tuesday morning, the foundrymen were welcomed to Chicago by W. J. Kelly, chairman of the Convention Bureau, Chicago Association of Commerce, who commented on the tremendous changes which had taken place since the last Chicago meeting of the Association in 1914. Mr. Kelly announced that the city of Chicago has just authorized the construction of a palatial convention hall which will be entirely adequate to house future meetings and exhibitions of the Association.



S. W. UTLEY
President



S. T. JOHNSTON
Vice-President

C. E. HOYT
Executive Secretary-Treasurer

GROWTH OF THE ASSOCIATION

President Utley, in his annual address, called attention to the fact that the membership of the Association is now 2300, an increase of 125 per cent in the past ten years. The Association now supports forty-two committees and co-operates in seventeen joint committees. Despite this gratifying growth it would seem that the work of the

Association can still be greatly extended and its membership further increased since there are approximately 5800 foundries in the United States and Canada.

President Utley then called on the chairman of each of the principal committees to make brief reports of their activities. H. Cole Estep, chairman of the Committee on International Relations, announced that a definite schedule for international meetings has been adopted, providing for such a meeting once every three years, these meetings to be held in England, Germany, France and the United States, in regular rotation. According to this schedule the next meeting will open in London, England, on May 28, 1929. It will be followed by a meeting in Germany in 1932, France in 1935, the United States in 1938.

The Nominating Committee reported that in view of the fact that the present officers had served only a little more than six months, it was thought best to nominate them for re-election. As there were no other nominations the existing officers were declared re-elected for a term ending in May, 1928.

It was announced that the 1928 meeting will be held in Philadelphia, the exhibit opening on Saturday, May 12, and lasting through Friday, May 18th. Technical sessions will open on Monday, May 14th.

G. H. CLAWER
Past President

N. K. B. PATCH
Director

L. W. OLSON
Director

Non-Ferrous Session

The non-ferrous session held Thursday morning, June 9th, was presided over by N. K. B. Patch of the Lumen Bearing Company. A paper on the Reduction of Molding Losses by R. A. Greene of the Ohio Brass Company, described the system employed by that company to interest the molders in the reduction of scrap losses. (This paper was reprinted in The Metal Industry for June, page 246-7). The molders work in three divisions, each under the direction of an instructor or molding foreman. Each day's scrap is recorded separately and that portion of it due to molding defects is charged to the molder concerned. Charts are posted in the foundry every day showing the record of each molder. Other charts show the combined record of each foreman's division. From time to time, charts are posted showing the average results of each division for the past month or the past quarter as compared with previous periods. The intense interest taken by the foremen and the individual molders in the competitive nature of this system has resulted in greatly reducing the molding scrap. In reply to a question, Mr. Greene stated that the molders pour their own metal but that he believed the same system, in a modified form, could be profitably employed with molders who do not pour the metal.

A paper on the "Improvement of Aluminum Bronze as an Engineering Material," by Dr. R. C. Reader of Birmingham, England, was read by Mr. Zaiser, of the American Metal Products Company. Dr. Reader discussed the effect of adding iron, nickel or manganese and concluded that for certain purposes, all are useful. The improved properties obtained from chill castings were pointed out and the importance of correct mold design and gating were emphasized. Unlike most other non-ferrous alloys, the properties of aluminum bronze can be widely varied by heat treatment.

The most animated discussion was aroused by a symposium on gating practice, led by R. L. Binney of the Binney Castings Company; D. E. Brogg of the Neptune Meter Company; C. V. Nass of the Ohio Brass Company; E. F. Hess of the Ohio Injector Company, and R. R. Clarke, of the General Electric Company. The use of risers and skim gates was thoroughly discussed. Mr. Clarke described a centrifugal type of skimmer in which the runner is brought into a riser at a tangent, producing a swirling notion which separates out the dross and dirt before the metal reaches the casting.

REPORT ON FOUNDRY REFRACTORIES

The Joint Committee on Foundry Refractories made a report at this session by H. M. St. John, chairman of the sub-committee on Non-Ferrous Survey. A number of charts were shown indicating experience in different plants with different furnace types as brought out by the questionnaire sent out by the committee about a year ago. It was pointed out that the difference in results obtained was far greater than could be explained by any variation in normal conditions from plant to plant. It is the intention of the committee to supplement its preliminary report made at the Detroit meeting by a report which will enable the individual foundry to learn how its results with furnace refractories compare with the general average and with what may be called "best practice." It is the hope of the committee that the average results obtained can be greatly improved by the more general adoption of methods which have already justified themselves in a few plants.

BRASS FOUNDRY ROUND TABLE

N. K. B. Patch of the Lumen Bearing Company also presided over the round table conference on brass foundry

problems held Wednesday noon, June 8th. This meeting, beginning with a luncheon at 12:15 was largely attended and resulted in a brisk discussion which did not close until after four o'clock. As usual with these meetings no stenographic notes were taken and no detailed account of the discussion can be given. Such questions as metal loss and metal quality in electric furnaces as compared with fuel-fired furnaces, the use of pyrometers in temperature measurement and control, molding sand control in brass foundries and the reasons for various casting defects and troubles were freely talked over.

GENERAL FOUNDRY PROBLEMS

At a number of the other sessions, matters of interest to the non-ferrous industries were the subjects of various papers. At the meeting on General Foundry Practice, Tuesday morning, J. W. Bolton of the Lunkenheimer Company, in the chair, V. A. Crosby of the Studebaker Corporation presented an able paper on Core Oil Specifications. Mr. Crosby gave a specification which he finds satisfactory, including limits on specific gravity, flash point, fire point, iodine number, saponification number, acid number, color and odor. He placed special emphasis on the iodine number and the acid number, the former because it is a direct indication of the strength of the finished core, the latter because it has a bearing on the stickiness of the core sand mixture.

In discussing Mr. Crosby's paper, Professor Campbell of the University of Michigan criticised the specification as outlined on the ground that the value of a core oil can properly be determined only by breaking test pieces in which the oil has been used since the real value of the oil is determined only by the strength which it gives to the finished core. In reply it was argued by Mr. Crosby and also by Mr. Smith of the Werner G. Smith Company, that many variables, difficult to control, enter into the making of test pieces and that the results of such tests are likely to be misleading. The value of the chemical specification lies in the fact that it prevents the use of inferior materials or careless manufacturing practice. White the specification suggested could not be used without modification in brass foundries or in some iron foundries, it is an example of a successful specification which suitably revised, could be used in other foundries. A paper on Test Bars to Establish the Fluidity Qualities of Cast Iron by C. Curry of Ardennes, France, was abstracted by Mr. McKenzie of the American Cast Iron Pipe Company. In this paper the author defined fluidity and described various means which have been suggested for its determination as a quality of molten metal. He explained the merits of an improved test piece of spiral form, with which remarkably consistent results have been obtained. The paper included a very interesting table showing the relative fluidity of a number of brass and bronze alloys tested in this manner.

A paper on Foundry Blacking by D. G. Anderson and A. N. Ogden of the Western Electric Company described an electrical method of testing blacking as used on cores and dry sand molds. In discussion it was stated by R. F. Harrington that many troubles commonly attributed to sand, metal, temperature, etc., should really be ascribed to the manner in which the blacking is mixed and applied.

FOUNDRY SAND CONTROL

There were two sessions on foundry sand control, but as usual, these were chiefly concerned with the qualities of sand required for use in steel and iron foundries. The use of Bentonite as an artificial bond for molding sands received considerable attention and favorable results were reported in several instances. A paper on The Effects of Moisture Absorption on the Properties of Dry Sand Cores by Professor H. L. Campbell, University of Michigan, described a series of experiments to determine the absorption of moisture by baked cores when placed in green sand molds for varying lengths of time and the properties of these cores before and after. It was found that the strength of the cores decreased as a result of exposure to the moisture in the green sand even though the actual weight of moisture absorbed was relatively small. The permeability or venting property of the cores was not affected by exposures up to 24 hours duration. Cores made up with linseed oil absorbed least moisture but lost strength more rapidly than cores made with powdered rosin. Cores made with blackstrap molasses and with dextrin were too soft to be handled after eight hours in the mold.

OTHER ACTIVITIES

The plant visitation program included trips to many Chicago foundries and on Friday a visit to the clay and sand industries in the Ottawa and Joliet districts.

The Edgewater Beach Hotel proved to be ideal as a headquarters for the convention and its location made the entertainment program particularly enjoyable. The annual banquet held on Wednesday evening was addressed by President Stuart Wells Utley and by Dr. Preston Bradley of the Peoples' Church, Chicago. The Joseph S. Seaman medal was presented to Major Robert A. Bull and announcement was made of the winners of the attendance contests and of the various apprentice contests.

APPRENTICE MOLDING CONTEST WINNERS

First prize: Siegfried V. Hanson, apprentice at Pettibone-Mulliken Company, Chicago.

Second prize: Joseph L. Asp, apprentice at Pettibone-Mulliken Company, Chicago.

Third prize: Lester G. Furber, apprentice at Brown & Sharpe Manufacturing Company, Providence, R. I.

1928 CONVENTION

The 1928 convention, together with the regular exposition of foundry equipment will be held in Philadelphia, Pa., late in May or early in June, at the Commercial Museum.

Lead Oxidation

By W. J. REARDON

Q.—We have a renovator for dross and run down the hot drosses that are skimmed from stereotype pots in metal plants. When we swing the valve around and dump the contents after they are melted into the mold with the tin, we drop a yellow powder.

We recover in melting about 80%, but the writer noticed that there is a cloud of smoke that comes out. Of course, when the windows are open it is all right, but in closed plants the fumes sometimes penetrate.

In the melting of the dross we use a flux. Can you suggest to us any chemical or powder that we could have thrown on the outlet spout that would eliminate these fumes?

A.—The yellow powder you find when you dump the contents of your furnace is oxide of lead or litharge, caused by agitation of the drosses. This is how litharge is made. The only method of eliminating the smoke when drosses are smelted or refined is to place a hood over the furnace to draw the fumes out in such a small melting unit as you have. In a large smelter the fumes can be sent through a bag house and the contents recovered.

There is no chemical that we know of that will eliminate fumes from molten metal.

Melting Nickel Alloys

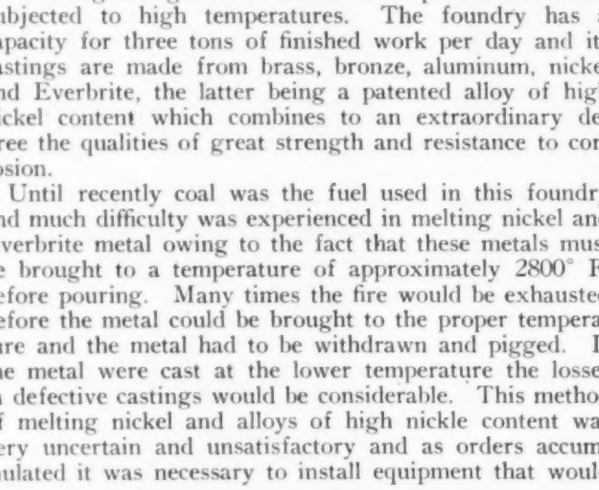
The Pouring of High Temperature Metal Castings Improved by Gas

By JUSTIN A. DUNCAN
President and Treasurer, William Duncan Company, East Boston, Mass.

Modern civilization with its fast transportation, quick communication and mass production is continually demanding metal castings of tougher, more non-corrosive alloys. These exacting requirements have been met, but the foundryman has been sorely tried to melt and pour these tough alloys into perfect castings.

One vexing problem was solved by the William Duncan Company of East Boston, Mass., after much experimentation. This company was established in 1875 as a brass foundry and today is making commercial castings for high pressures and heavy duty work such as valves, valve seats, pistons, nozzle blocks for turbines, phosphor bronze bushing stock, bearing metal, journal boxes, steam, water and air regulating devices and kindred products that are subjected to high temperatures. The foundry has a capacity for three tons of finished work per day and its castings are made from brass, bronze, aluminum, nickel and Everbrite, the latter being a patented alloy of high nickel content which combines to an extraordinary degree the qualities of great strength and resistance to corrosion.

Until recently coal was the fuel used in this foundry and much difficulty was experienced in melting nickel and Everbrite metal owing to the fact that these metals must be brought to a temperature of approximately 2800° F. before pouring. Many times the fire would be exhausted before the metal could be brought to the proper temperature and the metal had to be withdrawn and pigged. If the metal were cast at the lower temperature the losses in defective castings would be considerable. This method of melting nickel and alloys of high nickle content was very uncertain and unsatisfactory and as orders accummulated it was necessary to install equipment that would



CORNER IN FOUNDRY OF WILLIAM DUNCAN COMPANY

supply continuous heat properly controlled so that metal could be supplied at definite periods at the proper temperatures with all elements of chance eliminated.

Gas was recommended, tried and found so successful that we immediately installed two gas-fired, recuperative, crucible furnaces manufactured by the Surface Combustion Company of New York. The change to these gas-fired furnaces brought about great savings in time, labor and fuel. Whereas formerly it took about six hours to melt a heat of nickel in the coal fired furnace, the time was cut to 2½ hours for the initial heat and one hour and 50 minutes for subsequent heats with gas.

In the melting of bronze, brass and other non-ferrous

GAS-FIRED CRUCIBLE RECUPERATIVE MELTING FURNACE

alloys, in our coal fired furnaces we usually obtained two heats per day for each furnace. With the gas-fired furnace we get out the first heat in 1½ hours and subsequent heats every hour thereafter. These results are obtained using No. 80 crucibles at all times.

Gas-fired core ovens were also installed in our foundry which have given satisfaction. These ovens bake so much faster that one gas-fired oven will do as much work as three coal fired units.

Cutting Threads

By P. W. Blair

Q.—Please furnish us information on how to cut double, also triple, threads using a universal Fox lathe with chasing bar.

A.—First determine the depth of thread to be cut. If you are to cut a double thread of 4 to the inch, the depth will only be half that of a single thread of this pitch or the same as a thread of 8 to the inch. Cut the first thread to the proper depth as though you were cutting an 8 thread. The next step is to locate the thread tool exactly half-way between the threads already cut or in the blank space left between the threads. This can be done by measurement, but the usual way is to leave the tool post, and turn the work half a revolution. If the work is driven by a bent tail dog in a face plate slot, the tail can be put in the opposite slot. If driven by a stud in the face plate, another stud can be placed opposite the first and the dog shifted to bear on the other stud. Where much multiple thread cutting is to be done, it is a common practice to have a double face plate with index holes for the desired number of multiple threads to be cut. Then the outer face plate is simply shifted on the main plate and located by the index pins. This saves all calculation or worry and also saves time.

Smelting Secondary Aluminum and Aluminum Alloys

A Series of Articles on the Reclamation of All Forms of Scrap and Used Aluminum and Aluminum Alloys. Part 6. Preparation of Aluminum Scraps for Smelting.*

Written for The Metal Industry by Dr. ROBERT J. ANDERSON, Consulting Metallurgical Engineer.

In previous articles, various general aspects of aluminum-recovery practice have been discussed, and in the present article the preliminary treatment of the different kinds of scraps prior to actual smelting is taken up. Certain kinds of scraps can be smelted economically without prior treatment, and others must be given appropriate preliminary treatment before charging into the furnace in order to ensure good recoveries. Also, some kinds of scraps must be given preliminary treatment in order to remove undesirable constituents and hence permit better grade metal to be made, e. g., by the magnetic removal of free iron from borings. As has been indicated, in previous articles in this series, the chief forms of aluminum and aluminum-alloy scraps which are received by the secondary smelter include drosses and skimmings, borings and other chips from machining, old castings, new sheet clippings, old utensils, painted sheet, and miscellaneous scrap.

Whether preliminary treatment is given or not to aluminum scrap prior to smelting depends on the character and condition of the scrap and the quality of metal to be made therefrom. A lot of scrap castings may consist of old castings of substantially the same composition, having been derived from a given source, or such a lot may consist of a heterogeneous mixture of aluminum alloys of various compositions. Scrap castings may therefore be remelted directly to yield a known alloy, blended with other scrap, or simply run down (in the case of a mixed and unknown lot) into ordinary remelt alloy. Scrap castings are not ordinarily given premliminary treatment before melting, although if very oily and dirty, they may be washed in gasoline or dilute sodium-hydroxide solution. Of course, all foreign metals which may be attached to scrap castings are normally removed before remelting, e. g., steel studs and other fittings from old crankcases. It may be said paranthetically that aluminum founders will do well to avoid the use of old casting scrap, particularly the small shops. Unless a plant is equipped to make large heats of five tons or more which can be pigged, analyzed, and made up into definite alloys, foundries are better off if they buy primary aluminum or good grade secondary metal.

Both borings and drosses may be, and actually are, smelted as such, i. e., in the condition as received, but more often some preliminary preparatory treatment is given to such scrap. As indicated in a previous article, both clean borings and other light scraps can be remelted and the metal recovered with comparatively small oxidation losses, but if small amounts of dirt or similar foreign matter are present, the difficulty of causing the separate particles to coalesce is greatly increased. Wet or oily borings are normally dried before smelting. In the case of drosses and skimmings, the greater the amount of aluminum oxide present, the greater the loss on smelting, particularly if the temperatures are allowed to become high. Although considerable experimental attention has been given to the treatment of borings and drosses prior to smelting, with the object of increasing the recovery of metal, it is usual to use only the more simple treatment.

*Parts 1, 2, 3, 4, and 5 were published in our issues of January, 1925, September, 1925, February, 1926, May, 1926, and November, 1926, respectively.

PREPARATION OF DROSSES AND SKIMMINGS

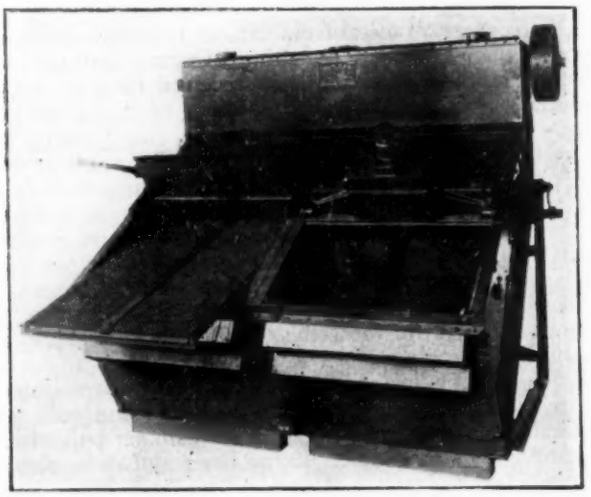
The recovery of metal from drosses is much more complicated than the mere remelting of scrap castings. In practice, a lot of skimmings as received may consist of material varying from large spatters of metal or rich lumps to crumbly material containing little metal but much fine aluminum oxide. In order to run dull drosses and poor-grade skimmings successfully, it is necessary to use a preliminary treatment which will remove as much of the non-metallic matter as is economical and feasible. Rich (so-called bright) dross should be smelted directly. Owing to the physical characteristics of dull drosses, it is necessary to crush the materials by some form of crusher that will jar loose the oxidized non-metallic part. Crushing by rolling or pressing forces seems to knead the non-metallic material into the metallic part instead of freeing it. Jaw or gyratory crushers and rolls are unsuitable for dross crushing. Swing-hammer pulverizers and ball mills are suitable. Large chunks of dross should be given preliminary sledging before feeding to these crushers.

In the case of the swing-hammer pulverizer, the size of opening of the bars is dependent, of course, upon the character of the dross and the fineness to which crushing must be carried. The metal present in drosses exerts heavy strain on the pulverizer, and heavy construction is necessary since otherwise maintenance costs will be high. It is necessary to permit no tramp iron or large pieces of metallic aluminum to be charged to the pulverizer since such material may not only clog the bars but also cause breakages of the hammers and other parts. Drosses and skimmings may be run over a picking belt and grizzly for the purpose of removing these materials before crushing. Any large rich pieces picked out of dross are, of course, smelted direct.

The Hardinge conical ball mill is a suitable mill for crushing aluminum drosses. The dross should first be broken up to such size as will permit the lumps to be admitted easily to the feeder of the mill. In the mill, the lumps are reduced in size and the oxide ground off. The discharge from the mill may pass over a rough screen to remove the larger pieces of metal, and the undersize goes to a finer screen (say about 20-mesh). The oversize from this latter screen is mainly metallic aluminum, and the undersize may be further classified into smaller sizes with all material below 60-mesh going to waste. A 4½ ft. Hardinge mill has a capacity of about 2,500 lbs. of dross per hour.

Irrespective of the kind of crusher used, the discharge must be screened, and the most satisfactory apparatus for this work is some type of mechanical or electrical vibrating screen. Aluminum oxide is hygroscopic, and this property of the material causes clogging of most other types of screens, e. g., revolving trommels, with resulting decrease in the efficiency of the separation. The screen may be 8 to 65-mesh, the fineness depending on various factors, or several screens of increasing fineness may be used as indicated above. The screen mesh must be varied according to the material screened and the results required. Of course, the governing factor is the metallic content permissible in the fines. This in turn is

dependent upon the economic recovery of meal on smelting. Certain drosses can be extracted as to metallic content quite completely, while in the case of others it is economical to leave a certain percentage of free metal in the fines. At times, there is a market for fines of fairly high free metal content, and it may be more profitable to produce such fines for sale, rather than to extract the ultimate percentage of metal possible. Fig. 1 shows an electrically-vibrated screen for handling crushed drosses.



HUMMER INCLINED SCREEN; ELECTRO-MAGNETIC VIBRATION (W. S. TYLER COMPANY)

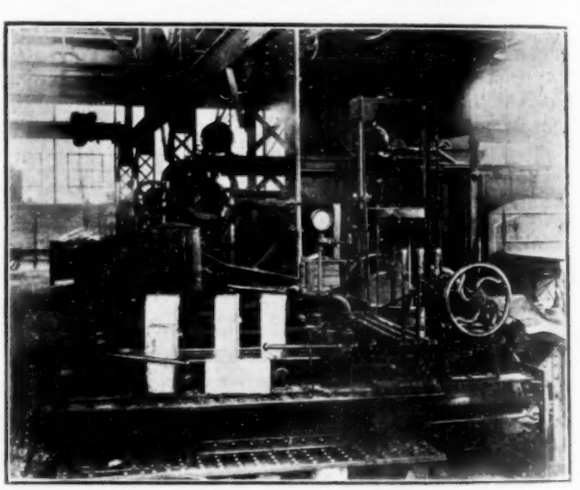
This type is employed at several plants. The oversize from successive screening operations may be passed over a magnetic separator, if necessary, for the removal of free iron; this is best done by running the oversize from the screen over a magnetic separator. Any roller magnet will accomplish this successfully.

After the preliminary treatment described above, the material is furnaced according to various methods, as will be described in a subsequent article in this series. When drosses are handled in the dry state, they may be stored in bins after the preliminary treatment until required for smelting. Drosses are concentrated by wet tumbling in some plants, i. e., in a wet tumbling barrel. When handled in this way, they must be smelted promptly since if left wet in the air, they will oxidize and heat.

PREPARATION OF ALUMINUM-ALLOY BORINGS

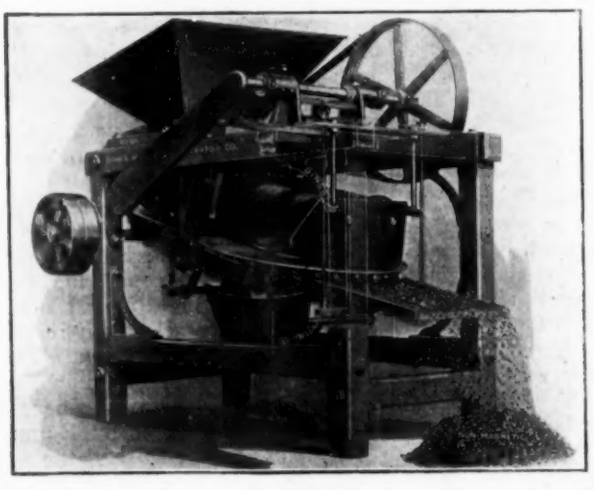
Some grades of dry borings are very clean and free from mechanically admixed iron. Such borings may be smelted directly without any preliminary treatment. With many grades of dry borings, it is general practice to run them over a magnetic separator for the removal of any particles of free iron. Small chips and drillings of steel or cast iron are often present in borings in appreciable quantities, and in order to obtain secondary aluminum-alloy pig of the required grade it is necessary to remove the iron before smelting. For borings, the magnetic separator should be of the disc type so that the material will be worked over thoroughly. Fig. 2 shows a suitable separator. Borings usually contain more or less oil, and a roll separator will not work efficiently on borings containing even a small amount of oil since too much of the chips will be carried away with the iron. Aluminum-alloy borings may contain chips of babbitt or other non-magnetic metals and alloys, and these cannot be removed economically.

The effect of entrained dirt upon the recovery in smelting borings has been mentioned. When the borings are oily, the dirt is held firmly, and screening is useless. Non-oily borings may be screened profitably for the purpose of removing dirt, cement, pieces of brick, and similar foreign matter that may be present. Oily or wet borings are normally dried before smelting, and after drying they may be treated on a magnetic separator. The average recovery on oily borings may be only 60 per cent as against 85 per cent on the same borings dried. Tests have been made on the centrifuging of wet borings, and this is quite efficacious but too expensive. Tests have been made with



HYDRAULIC BALING MACHINE (LOGEMANN BROTHERS COMPANY)

processes for washing or otherwise cleaning dirty or oily borings. Washing oily borings with hot water is useless since practically no oil is removed by this treatment. Gasoline is a suitable reagent for washing oily borings in that it removes the oil to a large extent, but the cost is rather high. Gasoline washing has been used on a large scale at one plant. Other washing media have also been tried. Usually wet or oily borings are dried by heating on pans; a rotary dryer has been tried. The sizing of borings before smelting is not practice. Tests by Gillett and James[1] have shown that if the finer particles are screened out of a lot of borings, greater recovery can be made on the larger pieces. Of course, some disposal would have to be made of the fines.



MAGNETIC SEPARATOR FOR BORINGS (DINGS MAGNETIC SEPARATOR COMPANY)

BALING ALUMINUM SCRAP

It is an economical procedure, and now standard prac-

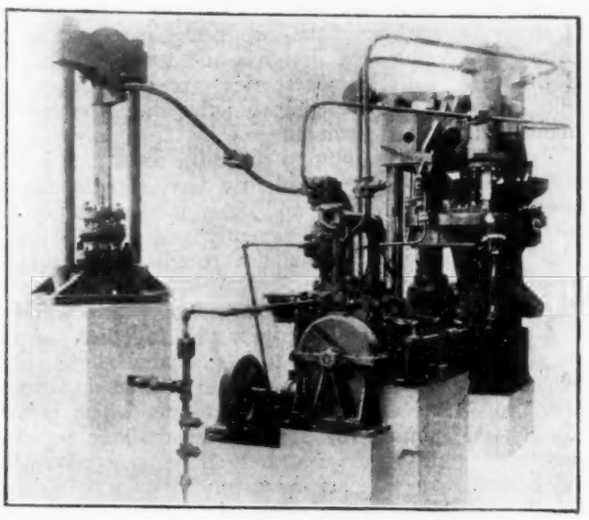
[1] H. W. Gillett and G. M. Jones, Melting aluminum chips, U. S. Bureau of Mines Bull. 108, Aug., 1916, pp. 58-60.

tice in various plants, to bale all light aluminum scrap prior to smelting. Baling of aluminum scrap is done by hydraulic baling machines similar in design and operation to those used for other scrap metals. The loose scrap is simply charged into a mechanical baler that forms a compact bundle of convenient size for handling, e. g., 5 by 5 by 13 inches. The usual scraps which should be baled before melting include new aluminum clips, pieces of sheet, old utensils, fine hay, and the like. The recovery on smelting baled scrap is so substantially greater than on loose scrap that the cost of baling is amply taken care of. Fig. 3 shows a view of an hydraulic baling press, with the cakes made of light aluminum sheet scrap. In baling old utensils, any tinned steel handles or other fittings should first be removed.

BRIQUETTING OF ALUMINUM BORINGS

Since fine and light aluminum alloy scraps yield a markedly higher oxidation loss on smelting than heavy scraps of the same composition, it has been suggested that these light scraps, especially borings, should be briquetted prior to melting. While briquetting, particularly of borings, has not been employed in the United States on a commercial basis, it is possible that it would be economical under some conditions, especially when there is a wide spread in the market price between light and heavy scraps. Although the actual recovery of metal from borings when pressed into briquets is substantially greater than on loose borings, the cost of briquetting is high. Briquetting is said to have found application in Europe to a slight extent. Borings, chips, and drillings, cannot be baled, and if they are to be gathered up into convenient form for handling and at the same time into such form that the oxidization loss on melting will be low, briquetting immediately suggests itself.

In briquetting aluminum-alloy borings, the air held by the loose material is removed, and the borings are put into such a form that they may be charged easily and also readily submerged beneath the surface of a liquid heel. Briquets of aluminum-alloy borings, if formed under heavy pressure, are almost as dense as pig metal. Hirsch[2] reports that in melting loose borings in a crucible the charge was run down in 50 minutes with a loss of 13.8 per cent, while in melting the borings after briquetting the loss was 8.1 per cent and the time of melting 30 minutes. The briquetting of aluminum-alloy borings has been studied experimentally by Stillman[3] and others. In the production of briquets from aluminum-alloy borings, as well as other metals and alloys, it is generally advisable that no binder be used unless a material can be employed which will serve also as a flux on melting. In metal briquetting, it is generally best to make the briquets



RONAY BRIQUETTING PRESS (STILLMAN)

by the medium of pressure alone. Fig. 4 shows a view of the Ronay briquetting press as made by the General Briquetting Co. This press has been applied commercially to the briquetting of brass chips and cast-iron turnings, and it is satisfactory for aluminum-alloy borings. Detailed description of the press is not necessary here, but briefly the briquets are made by filling a mold with loose borings and then compressing the material under hydraulic pressure by means of a direct-acting plunger.

The seventh article in this series will discuss practice in smelting the various kinds of scraps.

[2] E. F. Hirsch, Metall-briketts, Elektrochem. Zeit., vol. 35, 1914, pp. 1,092-1,094.

[3] A. L. Stillman, Briquetting of non-ferrous light metal scrap, THE METAL INDUSTRY, vol. 15, 1917, pp. 526-529.

Casting White Gold

By JEWELRY METALLURGIST

Q.—I am having trouble with my 10 k. and 14 k. cast white gold rings. Many of the castings will have fine pin holes and be of a spongy nature. I have experimented with most every make of alloy and find them all much the same.

At the present time, I am casting hundreds of rings a day and many of them must be scrapped for the above reason.

A.—When we remember that white gold is made of metals with very differing melting points, we see that it is hard to make it up in the first place, and still harder to get good results when it is melted up again for casting. Thus, most white golds contain nickel and zinc, among other things. The nickel has a very high melting point, the zinc a much lower one, and the zinc tends to volatilize. Both form oxides easily.

This calls for special care to avoid oxidation and overheating. Many users find that it pays to de-oxidize white gold by adding a bit of magnesium. Use magnesium ribbon, one grain to every ten ounces, pushing it to the bottom of the melt with a carbon rod after everything else is molten, and stirring. Then cast as soon as the melt becomes quiet again.

The dealers who sell white gold alloys will generally give you full directions for handling their products.

You say that you are casting hundreds of rings and some of them are good. We suggest that you watch your procedure and find out what difference there is between the handling that produces good castings and the handling that produces bad castings. Does the bad metal appear when you pour hotter than usual? Or when your metal has been heated longer than usual? Or when you use a certain kind of flux or a certain kind of crucible? Are some shapes harder to cast than others? Are your bad castings among the first to be poured from each melt—or are they among the last ones to be poured from each melt? Sometimes a little attention to points of this kind will solve the problem.

Metal Spinning

Methods of Spinning Candlesticks and Vases

Written for The Metal Industry by WILLIAM MASON, Metal Spinner

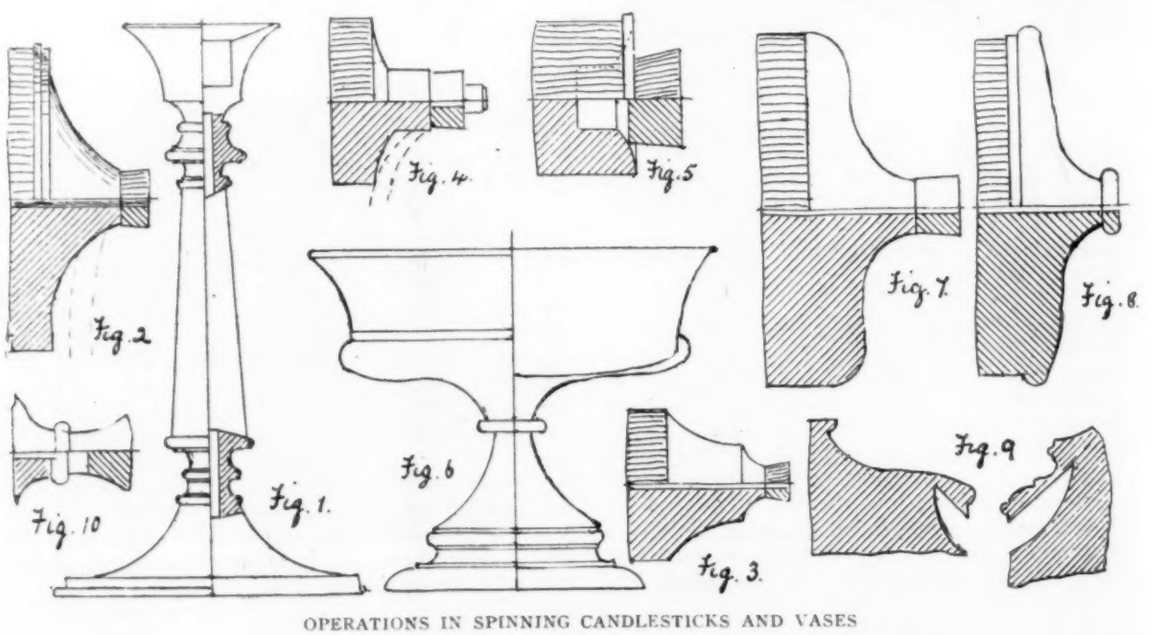
The candlestick, Fig. 1, can conveniently be divided in foot, stem, vase, and two necks; the foot, the stem, and the vase are spun, the two necks partly spun, the greater parts being cast in brass and turned. The foot and the vase, with its accessories, are spun out of flat blanks, and the stem is cut from the sheet, bent round a mandril, and hard soldered.

To make a perfect joint to the tube, fix a flat, smooth file between bits of sheet lead in a vice, slip the slightly opened joint over the file, and draw it a few times forwards and backwards while gently pressing the edges against the file teeth. This also roughens the surface, to hold the solder better. Anneal so as to remove all grease and dirt which may accumulate whilst working, and after pickling, tie the edges well together. Apply hard silver solder inside the tube so that a slight ridge, which can be filed away, will appear on the outside. Solder applied outside is apt to show as a line, which is very unsightly. To finish the stem it must either be hammered very gently and accurately on a mandril with a wooden mallet, or else put on a turned mandril rotating in the lathe and spun, and finished in the usual way by turning and polishing. The spinning of the foot is illustrated, with two intermediate stages, by Fig. 2. Move the spinning tool not only from the centre to the circumference, but also in the opposite direction, so as to force some of the metal towards the centre, otherwise the metal is apt to become too thin in the narrow neck of the foot, which weakens it.

When the work is finished, remove the bung and screw, and turn out the small bottom to a circular opening in which the small neck can be fitted tightly and soldered.

The vase consists of two parts, the vase proper and the lining. The first can be spun with the aid of the screw but as the lining must have no hole in it, a bung should be held in position by the tailstock. Furthermore, as the rim of the lining is laid over the rim of the vase, it will require two chucks. Fig. 3 shows the spinning of the vase, and Figs. 4 and 5 show stages in the spinning of the lining. The vase must have a small bottom turned to fit the brass neck, and is joined to the lining, using the chuck shown in Fig. 4, to fix the lining and pressing the vase home by the tailstock and a bung turned to fit the bottom part of the vase. The two necks must be turned so that each has a cylindrical part at each end, as shown in Fig. 1. It is advisable to bore the necks out with, at smallest, a ¼ in. drill, because when finished the candlestick ought to be filled with plaster-of-Paris, pitch, or resin mixed with a little dry sand. While the filling is liquid, drop an iron wire right through; this filling gives strength to the candlestick and prevents it being top-heavy. The candlestick must be suspended bottom upwards, so that only the proper quantity of liquid is poured in, and kept level. When it is set, a piece of green baize is glued on and trimmed, when the candlestick is ready.

The last piece of work here described is an ornamental vase, Fig. 6, and it is assumed that only one article is to be made; for more than one, complex chucks would be necessary. The vase is made in three pieces, of which the bowl may be spun similarly to the bowl of an egg-cup—that is, half deepened, half spun up. It must be turned and polished inside and outside, as far as it is not covered. The foot is in two pieces, made in a similar way. In Fig. 7 the metal is shown spun home on a chuck; anneal the metal and turn the chuck to shape, put on metal, and bring it well home to Fig. 8. The metal cannot be removed from the chuck without destroying the latter. When liberated from the chuck, the upper part of the foot should grip the bottom of the bowl, on which it is fixed by the aid of a few pellets of tinman's solder. The lower part of the foot is also made to fit the chuck tightly, and the wood destroyed by turning part away. Fig. 9 shows this; the ring-shaped piece of wood which remains inside the metal is easily dug out with a joiner's chisel or sharp pocket-knife. It will be seen that the two parts of the foot differ at the point where they are to be joined; Fig. 10 shows the reason.



OPERATIONS IN SPINNING CANDLESTICKS AND VASES

American Electro-Platers' Society Convention

Fifteenth Annual Convention Held in Toledo, Ohio, June 29-July 2

By F. J. HUNTLEY

Toledo certainly gave a warm welcome to the fifteenth annual convention of the American Electroplaters' Society which opened in that city on June 29 and continued through until July 2. The city itself not only did its best but the weather man joined with the local platers and taking the two together there was a warm time from start to finish.

The city of Toledo always has been noted for cordiality and it certainly left nothing undone. The local committees had been preparing for the event through many long months and the receptions, meetings and social events could not have been better handled.

Details were worked out from the Toledo end by Henry Schuldt, chairman of the local committee, who had the able assistance of Lester Cope and E. J. St. Arnaud.

The convention itself differed very little in principle from others that have been held in the past. The main features were educational but there was just sufficient entertainment and sociability to make it a pleasure from the first to the last day.

JOHN H. FEELEY
President

HORACE SMITH
Vice President

GEORGE GEHLING
Secretary-Treasurer

It certainly was a hot day as delegates from all sections of the country stepped from the trains on June 29, the first day. Most all of them had been experiencing cool weather for a considerable time and were almost unprepared for such a warm welcome. But it was not long before vests were discarded and straw hats became the vogue. However, some of the unfortunate souls who had forgotten to provide these hot-weather necessities, perspired for a few hours and then went out and purchased something more agreeable to wear. Then everyone was all set for the remainder of the week.

Approximately 350 delegates and some who were not delegates, were prompt to make their presence known.

There was not much doing officially during the morning of the first day. At 9 o'clock the advance guard began to arrive at convention headquarters in the Secor hotel. Practically the entire second floor had been given over for organization purposes. Also here was located practically all of the exhibits. These were particularly interesting, covering about everything relating to equipment for the plating industry.

It is no easy matter to register 350 or more delegates, passing out their tickets and other requirements to show they were accredited and officially entitled to attend everything and go where they pleased, so far as their presence related to the convention. But it all was accomplished with dispatch and every one was made to feel at home from the start. For this fine service too much credit cannot be given to the convention staff and members of the local committee who so graciously officiated.

No general session was held in the morning. There were, however, a number of committee meetings, reports of which were made later during the convention.

After registration the delegates were free until lunch time. Most of them left on shopping expeditions or visited some interesting part of the city. There was also much visitation and a renewal of old acquaintances. Much of this was done down in the lobby which, for a long time, was crowded, and presented an animated appearance. There was no difficulty picking an electroplater. They were so thoroughly tagged no one could make a mistake. The name of each individual also was prominently displayed.

Lunch time finally came and naturally this brought every one back to the hotel or to some other near-by place. It took about an hour to dispose of this pleasant function. One by one the delegates began again to gather in the lobby. This was a forerunner of the visit to the electroplating plant of the Gerity-Whitaker-Nagle Company, only a short walk from convention headquarters.

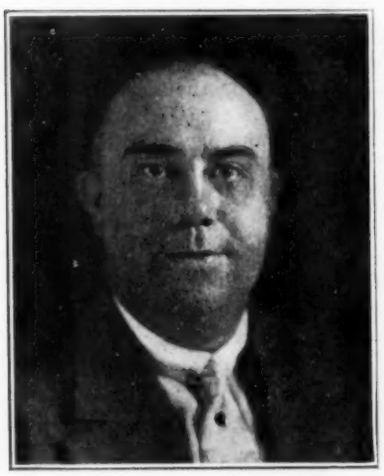
At the plant the visitors were most cordially received. The inspection over, a march back to the hotel was made. There was some more visiting and discussions when it became time to attend the opening session. This was held in the convention hall on the main floor.

All the supreme officers were there. President C. C. Mesle was at his best and so was George Gehling, secretary and treasurer, as well as Robert Steuernagle, first vice-president, and John H. Feeley, second vice-president. Then there was E. J. Musick, past president; C. H. Proctor, founder of the society, as well as F. J. Hanlon, editor of the platers' official publication.

The meeting was called to order by the chairman of the committee, Henry Schuldt, of Toledo. He made a nice little introductory talk, setting a happy tone that continued through the entire session. An address of welcome followed, by J. E. Nagel, president of the local organization. He also extended a cordial greeting and then introduced the mayor of the city, Fred J. Mery.

Mayor Mery welcomed the electroplaters just as cordially as the weather was doing. This was some invitation, for the thermometer at the moment he spoke was cavorting around the 90 mark. Every one by this time was waiting for a good chance to peel off his coat. Mayor Mery thanked the weather man for so ably assisting in the greeting and then told every one to have a good time.

The ladies had been guests at the opening and at this point it was announced they were at liberty to depart so they could take part in their own festivities. They did at once and in just a second after the last one had tripped out, off came coats, collars and other burdensome apparel. Secretary Gehling is no lightweight by any means and in about two minutes he was displaying a pair of arms that would cause almost any one to hesitate before stepping on his toes. Past President E. J. Musick, responded to the mayor in a way that could not help but please the Chief Executive of the City of Toledo.



F. J. HANLON
Editor, The Monthly Review

F. C. MESLE
Past President

Charles H. Proctor, founder of the organization, delivered a splendid address in which he declared that its aims continued just as high as they were fifteen years ago when it first came into existence. Mr. Proctor always has something good to say and there was no exception on this occasion.

President F. C. Mesle then delivered his annual address, and as an introduction, took a whack at the weather. He showed that the organization is in a flourishing condition and accomplishing great things for good in the plating industry.

At this point Dr. Brakley, of England, was called to the platform and made a pleasant two-minute address, in which he stated that America is taking the lead in research and other ways in the plating industry.

Then came reports of officers and the various committees. One of the pleasing features about all this was the optimism and the enthusiasm expressed. The afternoon session was then brought to a close.

The evening session was called at 8 o'clock. Most of this was technical, supreme President F. C. Mesle, presiding. George B. Hogaboom spoke on Nickel Anodes; Dr. William Blum, chemist, U. S. Bureau of Standards, on a "Summary of Research on Electro Deposition at the Bureau of Standards;" Joseph Hall, Chicago branch, "Silver Plating;" D. J. Benoliel, "Industrial Cleaners;" Henry Schuldt, "Ball Burnishing Brass Articles." This closed the evening session.

THURSDAY JUNE 30TH SESSIONS

Thursday morning, the second day of the convention, opened beastly hot. But notwithstanding, the hall on the first floor of the Secor Hotel was crowded with delegates eager to listen to the exceedingly instructive papers that were scheduled to start at 8:30. As during the afternoon before, coats and collars came off and sleeves were rolled up.

Floyd Taylor was the first speaker and he used lantern slides in describing the processes used in producing the Gillette razor blades. He was followed by Harry C. Barnard who discussed cleaners and cleaning. Then came Frank Leob, of the New York branch, with some interesting facts regarding oxidizing and etching of metals; T. A. Gardner, also of the New York Branch, "Some Odd Coloring on Metals"; Charles Kemish and Benjamin Deakin, Toronto Branch, "The Analysis of Plating Solutions"; Roy Kelley, Chicago Branch, "Brass Plating," and Frank Horath, St. Louis Branch, "Is the Cathode Similar to an Electro-Magnet?"

At 11:30 an adjournment was taken for lunch and a perspiring crowd of delegates scampered out for places of refuge from the intense heat. At this time the thermometer was hovering around 95 degrees in the shade.

One perspiring delegate was heard to remark, "Toledo certainly is giving the electroplaters one hot time. And certainly it is great to be here."

The program was varied at 1:30 by a trip to a number of industrial plants. This took up all the afternoon.

The evening program was crowded with interesting papers. Charles H. Proctor led off at 8:00 o'clock with a talk on "Recent Advances in the Commencial Deposition of Chromium and was followed by C. Van Derau, of the Dayton Branch, with one on "Chromium Plating." Then came E. G. Lovering, of the Detroit Branch, who spoke on "The Chromium Situation from a Practical Plater's Standpoint"; J. K. Preston, Hartford, Conn., Valley Branch, "Chromium Plating"; H. E. Haring, "Methods of Chromium Plating"; and Dr. William Blum, chemist of the U. S. Bureau of Standards, "Application of Chromium Plating." And thus the evening session was brought to a close.

Everybody went to bed that night in a sweltering atmosphere and dreamed of Friday morning and the full day over on Put-in-Bay island, out in Lake Erie.

The chromium plating exhibit in room 226 on the second floor near registration headquarters proved to be a point of interest. Exhibits at this place were made by the C. M. Hall Lamp Company, Detroit; The Dura Company, Toledo; the Mansfield, Ohio, Works of the Westinghouse Electric Manufacturing Company, prepared by C. Van Derau and the Chromium Speakman Company of Wilmington, Del.

Henry Schuldt, chairman of the local committee, was a busy man throughout the entire convention. It was due to his efficiency and that of Lester Cope, the organization's secretary, that everything proceeded so smoothly. There wasn't a hitch in any way, shape or manner.

"It was delightful to have fellow members of the American Electro-Platers' society with us here in Toledo."

Mr. Schuldt said, "we certainly have given them a warm reception. What we may have missed in doing the weather man made up."

Mr. Cope was just as enthusiastic in his expressions of good will as was Mr. Schuldt, and it was the same with every Toledo plater.

Everybody was pleased to greet Charles Proctor, founder of the national organization. He not only spoke to the pleasure of his colleagues, but his very presence produced an air of cheer that was inspiring. Mr. Proctor said he was looking for still greater things from the national organization and that its good work has only just begun although it is now fifteen years old.

William S. Schneider, New York city, newly elected secretary of the International Fellowship Club, declared directly after the honor was bestowed upon him that the organization was out for still greater things during the next year. This was the same expression of George B. Hogaboom, the newly elected president.

F. J. Hanlon, editor of the platers' publication, *The Monthly Review,* is enthusiastic for what is to come during the next year. He is looking for a bigger and a better publication and other improvements.

F. C. Mesle, the retiring president, is a cheerful person who makes every one feel good after he has met him. He is brimming with enthusiasm for the coming year.

FRIDAY JULY 1ST SESSIONS

Friday morning proved to be the hottest day of the Convention and it was a relief for everyone when it came time to board the steamer, Grayhound, for a trip out onto Lake Erie.

On the way over the convention was called to order in a cabin of the steamer. C. Van Derau, of the Dayton Branch, read a paper on "Research Developments and Standardization of Finishing Processes and Methods." W. P. Barrows, of the United States Bureau of Standards, followed with "A Progress Report on the Investigating of Spotting Out." Then came a talk from S. S. Tompkins, on "Cleaners, Methods of Application," and in conclusion, Mr. W. S. Barrows, Toronto Branch, had some interesting and instructive things to say on "Conditions Encountered in Various Types in Finishing of Steel Products."

Then came the Island. Dinner was served soon after arrival and later the delegates did about as they pleased. It was a great place for wandering, filled with many historical points dating back almost to the birth of the Country. While the people over in Toledo sweltered through the day with the thermometer well up into the nineties, on the Island and out in the lake it was cool and delightful.

No business sessions were scheduled for the trip back so that everyone who wished could dance and enjoy the music. When the boat reached Toledo just as the sun was going down the delegates were once more greeted with the warm weather. There was nothing further for the day.

SATURDAY JULY 2ND SESSIONS

Saturday was the concluding day. The convention was called to order at about 9:30. It still was warm and sultry and most every one resorted to his shirt sleeves again. Reports of committees were rushed through.

Then followed the announcements of the awards as follows:

GOLD MEDAL

C. E. **Van Derau,** Mansfield, Ohio, Dayton branch.

PAPER AWARDS

First prize, **A. K. Graham,** Philadelphia.

Second prize, **W. J. Kennedy,** Hartford, Connecticut, Valley Branch.

Third prize, **F. R. Nordman,** Cincinnati.

EXHIBITS

First prize, **C. E. Van Derau,** Mansfield, Ohio.

Second prize, **E. J. Lovering,** Detroit.

Third prize, **T. A. Gardner,** New York.

NEW OFFICERS

Then came the election of officers with the following results:

President, **John H. Feeley,** Montreal, Canada.

First Vice President, **Horace Smith,** Newark, N. J.

Second Vice President, **E. W. Heil,** Wichita, Kan.

Secretary and Treasurer, **George Gehling,** Philadelphia, Pa.

Editor, **F. J. Hanlon,** Chicago.

1928 CONVENTION IN TORONTO

An exceedingly cordial invitation to hold the 1928 convention in the City of Toronto was then announced. C. H. Proctor, founder of the organization, gave it his hearty support. The vote was unanimously to hold the next meeting in that city. This brought the business sessions to a close. Directly after lunch the delegates boarded buses for a two-hour trip about the city and through the historic Maumee Valley. This concluded the afternoon.

The convention came to a close in the evening with a banquet at the Secor Hotel. Nearly every one remained for this affair. The newly elected officers were installed at this time and the prizes awarded earlier in the day, were presented.

John H. Feeley, the newly-elected president, informed a representative of THE METAL INDUSTRY, that he expected to put his very best efforts into the organization during the coming year. He said already he was looking forward to the 1928 convention in Toronto.

C. H. Proctor, founder of the organization, remained through until the final event in the evening. He says he is anticipating wonderful progress during the coming year.

George Gehling, reelected secretary and treasurer, informed a representative of THE METAL INDUSTRY that he anticipated that 1928 would be the best year in the history of the American Electro-Platers' Society. He did a lot of hard work during the convention sessions. The same can also be said of F. C. Mesle, the retiring president.

E. I. Gleason, of Charles Hardy, Inc., New York, had some interesting things to say about the success of the Toledo convention. He is an optimist from first to last. This has been a great gathering of electroplaters and cannot help but mark progress in things accomplished by the organization, he told a representative of THE METAL INDUSTRY.

LADIES' ACTIVITIES

The ladies will not soon forget their delightful experiences at this convention. Like the others, they registered at 9 o'clock on Wednesday morning. This was followed by a renewal of old acquaintances and the making of new ones. Then they distributed about the hotel or sought pleasure elsewhere.

At 2 o'clock they attended the opening session for a short time and then were free to do as they liked for the remainder of the afternoon. In the evening they attended the theatre, and thus their first day in Toledo came to a close.

Thursday morning they visited the DeVilbiss Company and at noon were guests at a luncheon with a style

show at LaSalle's, a leading shopping center. At 3 o'clock in the afternoon they visited the Toledo Museum of Art, an experience that is well worth the time even though it was an extremely hot day.

Then came Friday morning when every-one boarded the steamer Grayhound at the foot of Madison avenue for a cool trip out on Lake Erie to Put-in-Bay, one of the historic spots in this section of the country. There was music and dancing all the way over, sports on the Island and other interesting things. The convention picture also was taken here.

Saturday morning there was a visit to the Paige Dairy Company and a trip around the city and through the historic Maumee Valley.

[As THE METAL INDUSTRY went to press immediately after the close of the convention, it was impossible to obtain the group photograph of the assembled electro-platers in time to include it in this issue. This photograph and those of some of the new officers will be shown in a later issue.—ED.]

NEW SUPPLY ASSOCIATION.

The Metal Finishers Equipment and Materials Association has been formed, whose membership includes the manufacturers of equipment and supplies for the plating, polishing and finishing industries. S. Huenerfauth of the Crown Rheostat & Supply Company, Chicago, Ill., was elected president. Detailed information will be published in an early issue of THE METAL INDUSTRY.

INTERNATIONAL FELLOWSHIP CLUB

The International Fellowship Club, that useful organization composed of men selling to the plating trade, held its annual dinner and election at the Secor Hotel in Toledo on June 29. The following are the newly elected officers: President, George B. Hogaboom; vice-president, F. J. Clark; secretary and treasurer, William Schneider.

A code of ethics also was adopted and the proposed new by-laws were discussed. It was decided at this meeting that the by-laws would come up for adoption at a future gathering.

O. C. Wilcox made a fine address in which he described his travels in the orient and Australia. He declared that America was the place for real fellowship.

Ernest Lamoreaux, the retiring president, also spoke in his pleasing way.

GEORGE B. HOGABOOM
President

Silver Solution Troubles

By CHARLES H. PROCTOR

Q.—I have recently been employed in a job shop which is very cold in the winter and the solutions stand on a cold concrete ground floor. The silver solution is a very old one and stands at 27° Bé and the bottom of the tank has at least 5" of crystals in it which seem to be nothing but carbonate of soda or a spent cyanide of sodium. I have washed the crystals fished from the bottom of silver solution, re-dissolved them in clean water and then with and without an addition of cyanide used a carbon anode and a bright strip of copper for cathode. There does not seem to be any silver in these crystals as they will not even discolor the copper cathode strip white when in contact with current. Is there any way to dissolve or re-convert these crystals into cyanide again or get them out of solution? Also what causes my steel anode hooks to rust and dissolve in silver solution; something I have never seen before; also steel knives when stripping in strike solution for replating?

I am not using any free or excess cyanide in my solution to speak of as there is not much metal in the solution and I would like to work that high gravity down a few degrees as it seems to be neither cyanide nor silver. They have been using the chloride of silver taken out of their old acid strippings which are so full of acid and other impurities that they cannot be washed and cleaned to a neutral form. Is this not the cause of my steel anode hooks rusting and dissolving? I also have some trouble with small pin holes in some of the silver plating mostly steel knives with upward streak or shot runs. What causes these things? Silver appears to be hard. Is this not lack of metal in solution?

The nickel solution is also so cold that the deposit is hard and brittle, and when deposited a Britannia metal will peel just as soon as put into hot water. It seems that the contraction of the two metals is different as it gives way under the different temperatures. If I give these articles just a flash in cold copper solution, they will hold but there is strict warning against using copper on some of this work. Would an addition of chloride of ammonia to solution help soften the nickel deposit?

A.—The greater part of your trouble is due to excessively cold solutions. If platers produce satisfactory results from their plating solutions in the summer from known proportions. If the solutions were maintained at the same temperature in the winter, then the results would be identical with those of summer. Nine-tenths of the trouble the plater has to contend with in the winter is due to the abnormal temperature of his solutions.

The very low temperature of your silver solution brought about a crystallization of the sodium carbonate in the bottom of the tank. This low temperature was excellent for the purpose and resulted in a better working solution under correct temperature of not less than 75 deg. F. The carbonates reduced from the silver solution are of no value. They contain no silver so can be thrown away or added to your cleaners after washing quickly in water.

The rusting of steel anode hooks used in supporting the silver anodes is no doubt due to an excess of chlorine in the silver solution. The answer is use hooks of nickel, Duriron or nichrome. It is poor practice to use silver strippings from acid strips in your regular silver soluton. They would not be so detrimental in a strike solution because the high free cyanide content would equalize the condition.

Streaking of silver deposits on steel knives is mostly due to the minute bits of the steel polishing materials becoming forced into the pits by the pressure and heat developed in polishing.

Steel knife manufacturers usually boil out the knives and forks in strong caustic soda solutions to saponify such greases, thereby preventing streaks in the silver deposit due to such greases and dirt that may be softened by the silver solution during plating.

Problems in Plating and Finishing

Written for The Metal Industry by CHARLES H. PROCTOR, Plating-Chemical Editor

Bluing Guns

Q.—Some time ago I obtained a formula from THE METAL INDUSTRY regarding the bluing of guns. The formula was for one pound of nitrate and one-half pound of nitrite heated to 700 degrees. It gives a fine blue but does not hold up as well as it should.

Could you offer me any suggestions as to a blue that would give long service?

A.—You must protect the blued surface of the guns or pistols from atmospheric oxidation and also to prevent abrasion of the surface. For this purpose a good prepared floor is a splendid material. It will resist moisture and give a much more permanent finish. Apply a little of the wax to the blued surface with a soft cloth, then lightly polish to a lustre finish. A little of such wax applied to the guns and pistols at intervals will result in a lasting finish. You may be able to obtain a harder blue by eliminating the sodium nitrite entirely and in its place use to every pound of sodium nitrate 1 oz. black oxide of manganese. This mixture will require about 900° F. for best results. Use the wax coating for this blue also.

Cadmium Plating

Q.—Being a subscriber to THE METAL INDUSTRY for some time, I take the liberty of asking you for some information with regard to cadmium plating. I would like to install about a 100-gallon tank. As I never had any experience in cadmium plating, I would like to know the upkeep of this solution and also some idea as to what it would cost me to make this quantity, such as the anodes and the formula for the solution. I have a tank 18 in. x 18 in. x 72 in. and would like to use this. My idea is to plate bumpers as I find that nickel does not give me the right kind of protection.

A.—Cadmium is not any more difficult to deposit than a deposit from a copper cyanide solution. There has been too much mystery surrounding the deposit. One of the best cadmium solutions for all purposes is prepared from the following proportions:

Water	1 gal.
Sodium cyanide (96-98%)	7 ozs.
Cadmium oxide	3 ozs.
Caustic potash	2 ozs.
Heavy black molasses	¼ oz.

Anodes, pure cadmium or alloyed with 2 per cent mercury. Temperature of solution 110-120 deg. F., voltage 5 to 5; anodes as outlined. The upkeep of the solution is mainly with sodium cyanide; in a constantly operated solution ⅛ oz. per gallon minimum is required. Occasionally add 4 ozs. caustic potash to a 100-gallon solution. Always keep the solution line constant with water. The cost of the above solution is approximately 32 cents per gallon.

Duplex Copper Solution

Q.—Please give me a formula for a duplex copper solution; also state in what way it differs from an acid copper solution.

A.—Duplex copper deposits and acid copper deposits are identical. They are both obtained from the same type of solution. The following formula gives excellent results:

Water	1 gal.
Copper sulphate	28 ozs.
Sulphuric acid (6%)	4 ozs.
Yellow powdered dextrin	¼ oz.

The sulphuric acid may be increased to 8 ozs. per gallon or more if found desirable at any time to increase anodic reduction. Use anodes of either cast copper or soft annealed heavy sheet copper. Voltage—1 to 2.

Soft Nickel Solution

Q.—I would like to have you send me a formula for a soft nickel solution to be burnished in burnishing barrel.

A.—The following formula for soft nickel deposits has always given excellent results:

Water	1 gal.
Double nickel salts	8 ozs.
Single nickel salts	4 ozs.
Boracic acid	2 ozs.
Sal-ammoniac	2 ozs.
Epsom salts	2 ozs.

Add to the solution to maintain its acidity, if found necessary, about ⅛ oz. acetic acid per gallon per day. To maintain the upkeep of the solution in metal, use the following basis:

Single nickel salts	16 ozs.
Nickel chloride	2 ozs.
Boracic acid	1 oz.
As little boiling water as possible to dissolve the materials.	

You will have to decide how much of the above combination will be required per day or week to maintain the solution in constant operation. The above formula is for barrel solution or may be used in a still tank.

Streaky Copper Deposit

Q.—I am having a little trouble with my cyanide copper solution. The work seems to come out very streaky. I have added cyanide but that does not seem to help any. Could you tell me what to use?

A.—You do not state just what proportions of materials were originally used in preparing your cyanide copper solution. You state you have added cyanide to the solution. How much? When streaked copper deposits develop it is an indication that the free cyanide content is low; the deposit clarifying agent hyposulphite of soda also. We suggest that you first make an addition of at least 1 oz. sodium cyanide and 1/32 oz. hyposulphite of soda per gallon to a test solution of 10 gallons or more. If these additions overcome the problem, then treat your regular solution accordingly. If not, then make a further addition to the test solution of 1 oz. bisulphite of soda and 1/3 oz. caustic soda per gallon of solution. The results will be satisfactory after operating the solution for a short time. Make similar additions to the regular working solution.

Spotting Out

Experiments on the Causes and Cure of Blemished Electro-Plates. From the Monthly Review of the American Electro-Platers' Society.

By A. KENNETH GRAHAM, Chemist, Hanson & Van Winkle Company, Newark, N. J.

"Spotting out," as spots and blemishes appearing under the lacquer on articles[1] sometimes after leaving the finishing department are designated, is a subject which has long been discussed and investigated without yielding much definite information as to its cause or elimination. In attempting to solve some problems of this nature the writer was led to some fairly definite conclusions which, it was thought, will be of general interest.

A distinction has already been made by George B. Hogaboom between the spots which are usually associated with "oxidized" finishes designated as "spotting-in" and those which may develop with other finishes designated as "spotting-out." The former is believed to be developed from without and not from within the metal as in the latter case. We shall adhere to this classification in what follows.

The cause of spotting-out beneath the lacquer if located within the metal can only be associated with imperfections —a lack of uniformity in structure. It is significant, therefore, that spotting-out is not commonly associated with rolled copper or brass, both of which are extremely uniform in composition and structure. Low grade brass castings, on the other hand, are admittedly non-uniform in these respects and commonly found to spot out.

It has been thought that spotting-out is due to the cleaning, dipping or plating solutions becoming entrapped in holes (pores) in the metal and later working out beneath the lacquer. The writer has found this to be the case, but believes that the holes may originate not only from imperfect castings producing porous metal (brass castings), but also from the action of the cleaning solutions on areas of segregated impurities in the metal (steel, cast iron, brass, etc.). The chemical attack of the solutions about these areas would be accelerated by the electrolytic effect produced by two dissimilar constituents.

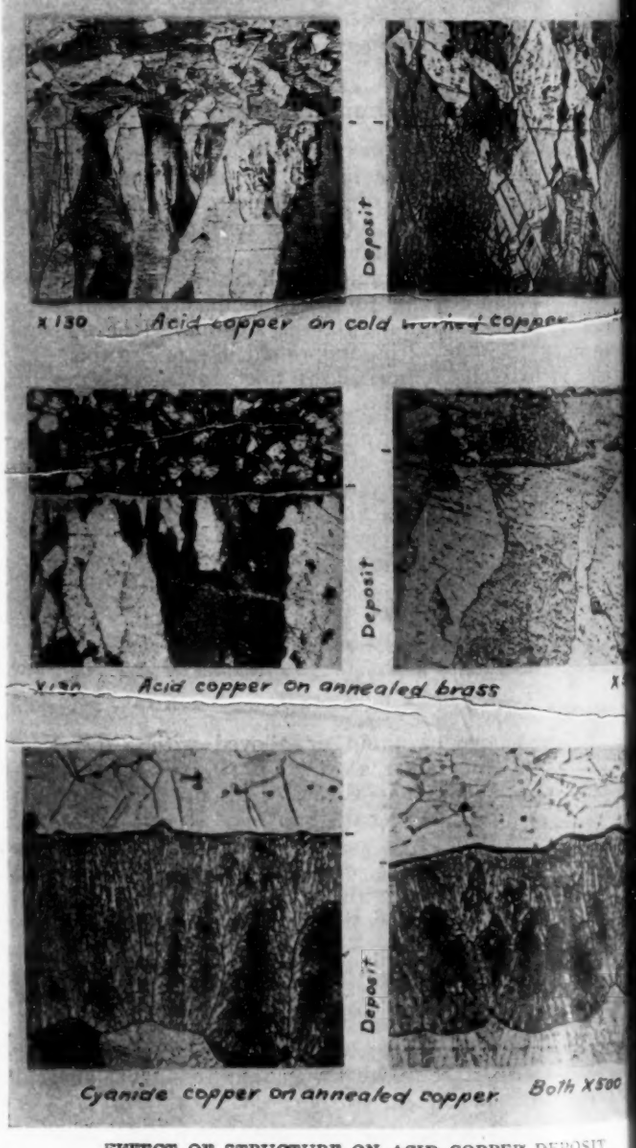
A confirmation of the above opinion is found in the following: Williams and Homerberg[2] found that cathode hydrogen from caustic solutions produced blisters around slag inclusions in steel and that intercrystalline cracks resulted. The iron oxide in the slag is most readily attacked by cathodic hydrogen, blistering the surface, and sulphide is attacked by boiling caustic. This would produce holes sufficient to cause spotting-out in what may be regarded as sound metal, yet non-uniform in structure because of the slag.

McCullough and Reiff[3], while copper plating iron to prevent case-hardening, definitely identified holes in the deposit with slag inclusions. Other metals would undoubtedly exhibit the same tendency, not covering the slag, at least at the beginning of plating and this would give the plating solution greater opportunity to penetrate the cracks caused by the attack of the slag while cleaning.

In cleaning brass, both acids and alkalies are employed. It is well known that any acid dip will attack an area of segregated impurities, as appear in low grade cast brass, more actively. Also, any blow holes will be found in these same areas and they are invariably lined with the impurities. Such common impurities that are to be found in these brass casting as lead, iron aluminum, tin and sometimes sulphur, will be readily attacked by the combined action of acids and alkalies. This would leave the metal more porous and susceptible to spotting-out than would be the case were these impurities not present.

This simple explanation of spotting-out is not necessarily original. It has been gleaned from opinions expressed in the literature, from practical platers and experience. In the experimental work on cast brass about to be presented it satisfies the results obtained. With cast iron, steel and die castings of various alloys it is very probable that it will be found to apply, but further experimental work is required to determine this.

Fig 1.

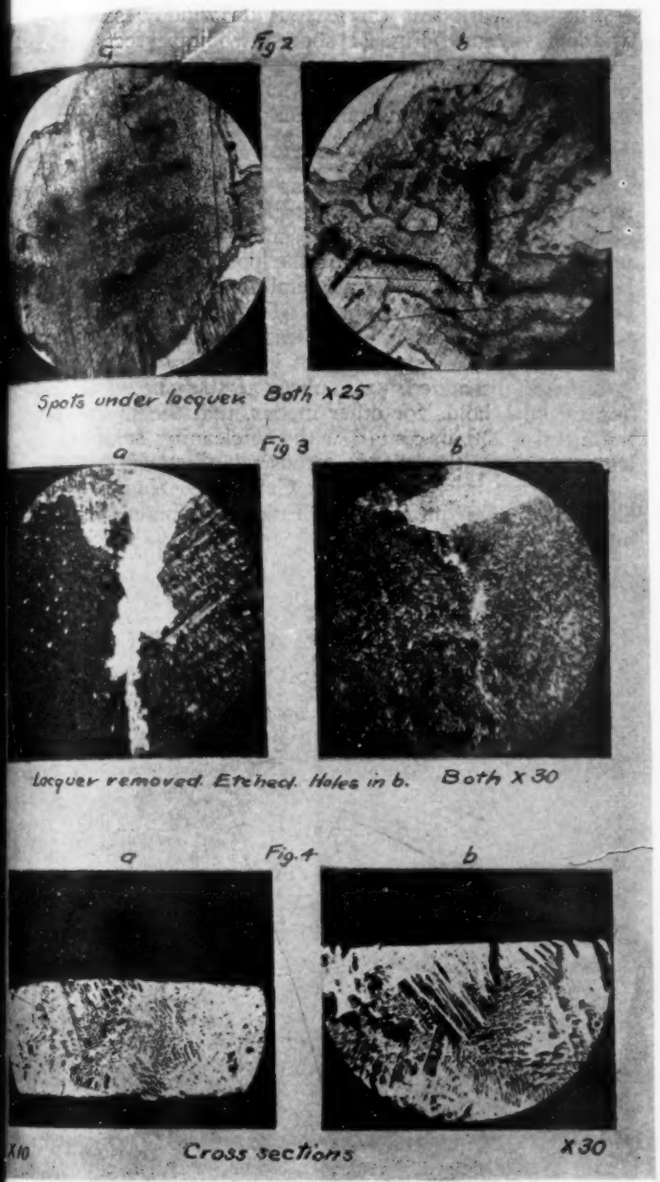


EFFECT OF STRUCTURE ON ACID COPPER DEPOSIT

[1] Articles of the common metals and alloys used in trade having received the more usual plated or dip finishes.

[2] Chem. and Met. Jour., Vol. 30, p. 589, 1924.

[3] Jour. Ind. Eng. Chem., 1924.



FIGS. 2, 3 AND 4. INVESTIGATION OF SPOTTED BRASS

EXPERIMENTAL WORK

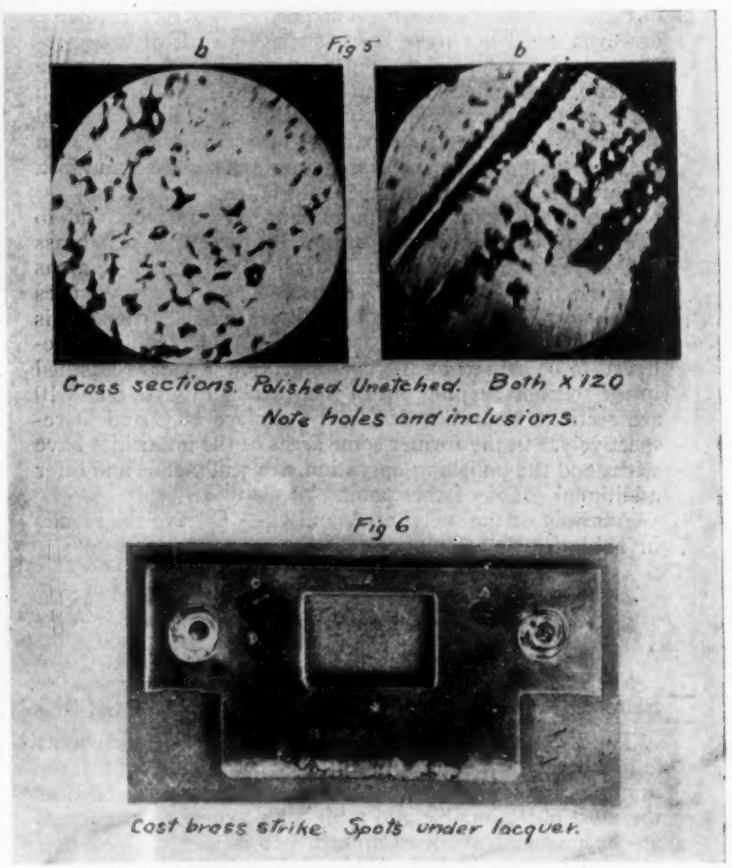
The fact that rolled copper and brass do not commonly spot out is all the more easily understood if plated articles are examined under the microscope. In a previous article[4] attention has been called to the extremely uniform structure of the base metal and how markedly the acid copper deposit is influenced in uniformity and structure. (Fig. 1.) That all metals deposited on such base metals should be equally uniform is to be expected. It would be difficult to conceive of spotting-out under such conditions.

With cast brass, if our theory is correct, it matters not whether a bright-dip or a plated finish—e. g. cyanide copper—is used. In either case the solution would become entrapped in the holes and gradually work out under the lacquer. This point has been verified, but if anything it is more severe with the acid dip so that in the work with brass only the dip finish was used.

A cast brass chain keeper was given a bright dip finish and later spotted out. The spots remained on removing the lacquer and reappeared at the same places on refinishing. The article was then cut in two and the first part refinished by stripping, dipping and then treating with cyanide, soap, cold and hot water. It was finally dried and lacquered with ordinary cotton lacquer to which had been added a small amount of phenolphthalein dissolved in alcohol. Spotting-out occurred at the old places, but this time in the form of red spots. The phenolphthalein was changed from its colorless to red form and this change can only be produced by free alkali. The only alkali used was in the form of cyanide and this had therefore been held in the metal causing the spotting-out.

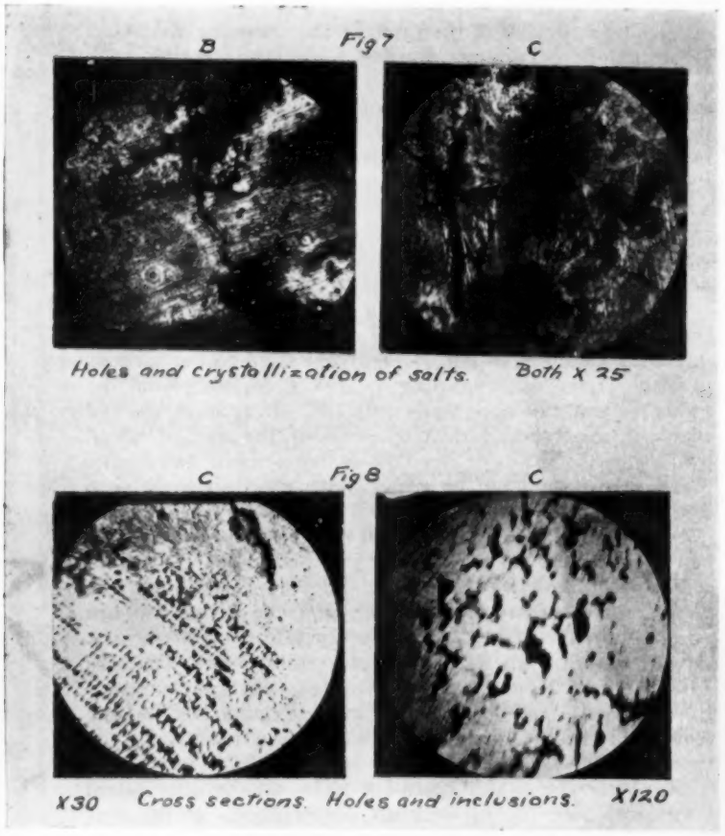
The second part of the chain keeper was refinished in the same way only omitting the cyanide solution and adding an alcoholic solution of methyl orange to the lacquer in place of the phenolphthalein. Spots developed but the indicator was not apparently affected. It at least showed that the spots could develop without the use of alkali cyanide, only the acid dip having been used, and heavy metal salts would not be expected to react strongly with an indicator.

A cast brass escutcheon which had spotted out after receiving a bright dip finish was examined under the microscope. Fig. 2 shows two spots as they appeared under the lacquer. Holes are plainly seen and the spots run out from these like a drop of water spreading on a surface. After removing the lacquer and etching (Grard's Acid $FeCl_3$) further observation showed a very coarse structure and staining of the surface in the same areas that the spots had existed. Figure 3 shows the structure of the metal on the surface at the two spots originally examined (Fig. 2) and in 3 (b) holes are to be seen in the crystal boundary. On cutting sections perpendicular to the surface (a) and (b) and polishing, a very porous structure was revealed under the microscope. See Fig. 4.



FIGS. 5 AND 6. SPOTTING DUE TO INCLUDED IMPURITIES

[4]Graham, Jour. Am. Electrochemical Soc., Vol. 44, 1923.



FIGS. 7 AND 8. PHOTOMICROGRAPHS OF SPOTS

It is not hard to see how the solutions could be entrapped in metal such as the above. The porous structure revealed, however, need not have been just a network of holes before it was placed in the finishing solutions. In fact the writer has stated that impurities must be associated with such a structure which upon dissolving leave the metal still more porous. In preparing the sections (Fig. 4) on the polishing wheels such impurities are loosened and lost. Figure 5 shows a little of the material still present.

In order to prove this point more conclusively and to determine what impurities might be present a cast brass strike (Fig. 6) was examined and badly spotted areas designated A, B, C and D. Figures 7 and 9 show pictures of spots under the microscope at these areas. Attention is called to the feathery appearance of C and D which is believed to be caused by the crystallization of salts contained in the solution seeping out of the metal. Figures 8 and 10 are sections perpendicular to the surface at C and D respectively. In the former some areas of the impurities have withstood the polishing operation, are still visible and offer additional proof of this point.

Analysis of the metal at A and C ÷ D gave the results in Table I.

TABLE I.

	Fe+Al %	Sn %	Pb %	Cu %	Zn %	
A.	0.81	0.12	3.54	71.36	24.17	(dif.)
C÷D	0.71	——	——	——	——	
Blank	0.44	0.36	3.56	71.31	24.33	(dif.)

The blank sample was taken where there were no spots and where the metal appeared perfectly sound. Of the impurities present the iron and aluminum are regarded as the most objectionable and a higher percentage was found at the unsound areas examined. It is also claimed that aluminum is particularly detrimental to brass casting when a high percentage of lead is present[5].

[5]Met. Ind., Vol. 22, p. 275, 1924.

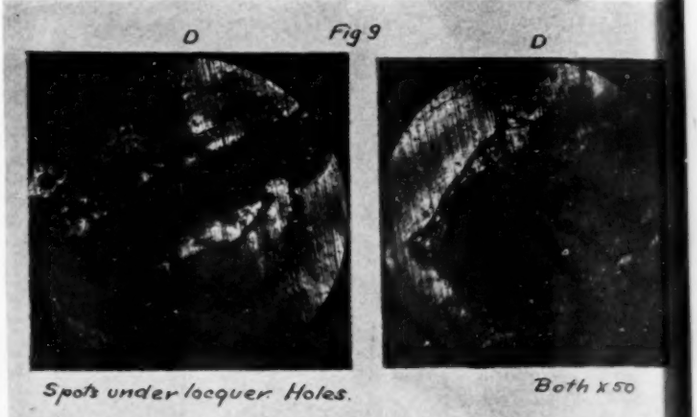
Further work was carried out on window strikes and window sweeps. Fig. 11 shows two imperfect sections. Where such structures were revealed spotting-out occurred on finishing. Also, where sections revealed perfectly sound metal no spotting-out took place after finishing.

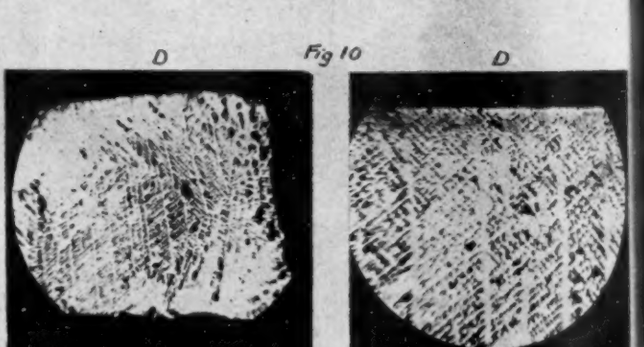
CONCLUSION

Knowing the cause of spotting-out should enable one to more intelligently correct the difficulty. For cast brass one would naturally suggest sound metal. This would undoubtedly improve it, but the possibility of obtaining perfect castings from scray metal for average grade sand cast articles is rather remote. The one recommendation that can be made is for good casting conditions and the eliminating as far as possible of impurities.

It might be added, particularly if this theory of spotting-out also holds for other metals, that the shorter time the metal is left in contact with the cleaning solutions the less chance will there be for proosity and spots to develop.

The writer wishes to thank George B. Hogaboom for his co-operation and Dr. H. S. Lukens for his usual kindly interest and suggestions.





FIGS. 10 AND 11. PHOTOMICROGRAPHS OF SPOTS

Testing Materials Meeting

Abstracts of the Papers and Reports on Metals at the Thirtieth Annual Meeting of the American Society for Testing Materials at French Lick, Indiana, June 20-24

The American Society for Testing Materials celebrated the 25th anniversary of its incorporation at its meeting in French Lick, Ind., June 20-24. About 625 men were registered.

The Charles B. Dudley Medal was awarded to Dr. D. J. McAdam, Jr., of the United States Naval Research Laboratory, Bellevue, Anacostia, D. C. Professor Moore made the presentation. The award was given for meritorious work and valuable publications on the fatigue of metals.

ABSTRACTS OF PAPERS.

Report of Committee E-1: On Methods of Testing. J. A. Capp, Chairman.

Reports the results of a general review of the present methods of the Society. Presents requirements for a standard tension test specimen for testing thin sheet metals. Recommends the advancement to standard of the methods of Brinell hardness testing of metallic materials, methods of calibration of testing machines by means of a calibration bar and the definitions of terms relating to methods of testing.

Report of Joint Research Committee of A.S.M.E. and A.S.T.M. on Effect of Temperature on the Properties of Metals. G. W. Saathoff, Chairman.

A report of progress of research that has been carried on during the year in studying the tension testing of metals at high temperatures, with possibly the inclusion of test results.

Report of Committee A-5: On Corrosion of Iron and Steel. J. H. Gibboney, Chairman.

Presents reports on inspection of copper-bearing and non-copper-bearing sheets exposed to the atmosphere and to total immersion. Reports progress on an extensive program of exposure tests of zinc-coated materials. Submits new specifications for zinc-coated sheets to replace the present standard specifications. Also presents six new tentative specifications for zinc-coated wire, fencing and fencing materials.

Report of Committee B-3: On Corrosion of Non-Ferrous Metals and Alloys. T. S. Fuller, Chairman.

Presents a summary of the co-operative work conducted on accelerated methods of corrosion testing. Recommends changes in these methods and outlines new testing programs.

A Rapid and Practical Method of Applying the Ferroxyl Test to Protective Coatings. By Karl Pitschner.

The "ferroxyl" test for determining the presence of pinholes in plated coatings has been in use for a long time but up to the present has been a laboratory test rather than a shop test, due to difficulties in the application of the reagent and in obtaining a permanent record. A search for a more practical mode of handling, led the author to the development of a test paper embodying the reagent by means of which it is possible to make a permanent record in two or three minutes. The reagent has been developed so that it will detect pinholes through nickel or chromium to copper as indicated by brownish red spots.

The advantages of this method of application are enumerated, and comparison of the test paper records with salt spray results are shown.

Report of Sectional Committee: On Specifications for Zinc Coating of Iron and Steel. J. A. Capp, Chairman.

Report of progress of the committee's work in the development of specifications for zinc coating of various iron and steel products, including pole-line hardware sheets, structural shapes, wire and wire products, and pipe and conduit.

Effect of Corrosion Upon the Fatigue Resistance of Thin Duralumin. By R. R. Moore.

This paper gives the results of fatigue tests on thin gage corroded duralumin. The investigation was made to determine the effect of the embrittlement of duralumin, due to corrosion, in terms of the resistance of the metal to repeated stresses or fatigue.

The results show the effect of a certain degree of corrosion upon the endurance limit. The corrosion of duralumin occurs predominately along the grain boundaries ("intercrystallin") and is of a continuous or progressive nature rather than a local pitting type, although some of the latter is present.

A method of making accurate fatigue tests on thin-gage light metals is given and the machine used in these tests is described.

Corrosion-Fatigue of Non-Ferrous Metals. By D. J. McAdam, Jr.

Part I gives a brief resume of previous work; an outline of the investigation and a description of the material and the methods of investigation.

Part II discusses corrosion-fatigue of nickel-copper alloys. The following subjects are considered: Fatigue and corrosion-fatigue graphs for nickel, monel metal, other nickel-copper alloys and copper; complexity of some corrosion-fatigue graphs; effects of cold-working on corrosion-fatigue limits; relationship between chemical composition and corrosion-fatigue limits of nickel-copper alloys.

Part III discusses corrosion-fatigue of aluminum alloys. The alloys considered are aluminum, aluminum-manganese alloy and duralumin. Fatigue and corrosion-fatigue graphs for these alloys are described and discussed. Effects of cold-working and heat-treatment of aluminum alloys are discussed.

Part IV is a general discussion of corrosion-fatigue of metals. Tentative hypotheses are discussed under the following headings: Intrinsic corrosion-fatigue limits; secondary influences affecting the corrosion-fatigue limit, relationship between fatigue and corrosion-fatigue.

Wear Testing of Metals. By H. J. French.

Factors affecting the wear of metals are considered and some of the difficulties encountered in making both laboratory and service wear tests are discussed. Two testing machines used in the study of the wearing properties of metals employed for widely different purposes are briefly described and attention is given in particular to the initial surface condition and "filming" of metals in relation to the procedure employed in making wear tests.

The report is a brief summary of the present status of wear testing of metals and includes results of experimental work to show that reproducible results and information consistent with practical experience can be secured in the laboratory.

Report of Committee B-1: On Copper Wire. J. A. Capp, Chairman.

Reports on co-operation with the American Electric Railway Association on bronze trolley wire specifications and with the National Electric Light Association on hard

wire for transmission purposes. Recommends the advancement to standard of tentative revisions of a number of copper wire specifications.

Report of Committee B-2: On Non-Ferrous Metals and Alloys. William Campbell, Chairman.

Presents new specifications for copper tubing for refrigerators, for brazing solder, for yellow brass sand castings, for bronze castings for locomotive bearing parts, for lined journal bearings, and for rolled zinc. Recommends the advancement of a number of tentative specifications and of a number of tentative revisions. Recommends the revision of the tentative methods of chemical analysis of aluminum.

Physical Properties and Methods of Test for Sheet Brass. H. N. Van Deusen, L. I. Shaw and C. H. Davis.

Discusses various types of tests applied, including Rockwell test with general discussion of the machine and its limitations; Amsler 90-deg. reverse bending machine test; ductility tests by means of Erichsen and Olsen machines; Meyer's analysis; and tension test. Data is presented in tables, curves, chemical analysis and photomicrographs. The requirements on high sheet brass are presented in a discussion of results.

Some Applications of the Spectrograph in an Industrial Laboratory. F. A. Hull and G. J. Steele.

Discusses the industrial laboratory application of the spectrograph in the analytical field, both from a qualitative and quantitative standpoint. Numerous applications in the quantitative analysis of such materials as pig lead, pigtin, pig aluminum, babbitts and similar products are explained and illustrated.

Fatigue Studies of Telephone Cable Sheath Alloys. By John R. Townsend.

This paper describes fatigue studies of lead sheath for telephone cables, the development of two forms of simulated service test and a fatigue machine designed to test lead and its alloys. The correlation between the characteristics of service and laboratory failures is stressed.

Fatigue failure of lead and the lead-antimony alloys covered by this paper is by intergranular failure. In the case of the lead-antimony alloys repeated stress appears to reduce the solid solubility of antimony in lead, producing a widened grain boundary as viewed under the microscope.

The type of fatigue test described is sensitive to very slight changes in composition and heat treatment for a particular class of materials. For example, the effect of impurities in the base metal and slight changes in composition is strikingly brought out by the results of the fatigue test.

Report of Committee B-4: On Metallic Materials for Electrical Heating. Dean Harvey, Chairman.

Presents a new method of test for change of resistance with temperature and new methods of chemical analysis of metallic materials for electrical heating. Reports preparation of life test to determine durability at high temperatures.

Report of Committee E-4: On Metallography. H. C. Boynton, Chairman.

Recommends the advancement to standard of the recommended practice for the care of the eyes when using the microscope and of the tentative definition of the term metallography. Recommends the revision of the standard methods of metallographic testing of non-ferrous alloys.

Soldering Flux

By W. L. Abate

Q.—Can you advise us if you know of a soldering flux which will not tarnish a copper surface as a zinc-chloride soldering solution does? Any help from you in this matter will be greatly appreciated.

A.—Your question is rather an indefinite one as you do not state what kind of work you have to do whether light or heavy and if you use a soldering copper or gas flame for heat. Gas has a tendency to overheat or burn the flux on the joint. Washing the parts after soldering in soda water or even clear running water will remove all acid.

The best flux is muriatic acid cut with plenty of zinc leaving some zinc after the acid has worked out. Let it settle for a day or two and dilute with distilled or rain water. You may add to the acid portion only ⅓ of its volume of spirits of sal-ammoniac if you think it advisable for your purpose. It is not absolutely necessary.

Wash the soldered parts immediately after soldering.

Another solution is as follows: Dissolve 1 part each of lactic acid and glycerin in 8 parts of water. This is not corrosive.

Powdered colophony, olive oil, turpentine, resin, tallow can all be used as agents in the art of soft soldering copper.

Soldering Silver to Nickel Silver

By P. W. Blair

Q.—In soldering silver contact tips to nickel silver and phosphor bronze springs we are using half-and-half solder with a non-corrosive soldering paste. After soldering the work is carefully washed, but after being in service for some time we find the tips often covered with corrosion in a dust-like form, which we believe to be due to the lead in the solder.

We have thought of using jeweler's silver solder but we cannot use sufficiently high heat without endangering the springs. Could you suggest a solder that could be used with a soldering iron that didn't contain lead or zinc?

A.—The best soft solder to use is made of pure tin and lead composed of 60 per cent tin; 40 per cent lead, using chloride of zinc as a flux.

In all cases where zinc chloride is used as a flux, the article should be carefully cleansed after soldering to prevent subsequent corrosion of the metal.

We are under the impression that it is the flux you are using or soldering paste that is causing this corrosion. To test same out, try soldering some tips, using powdered rosin for a flux to find out if it is in your solder or flux.

The cleaning compound you are washing them off with after soldering is perhaps not strong enough.

Note on the Crystal Structure of Electrodeposited Chromium*

By Frederick Sillers, Jr.

X-ray crystal analyses, by the powder method, of electro-deposited chromium in both the "bright" and the "gray" or "burnt" conditions show that it has the body centered cubic structure, the same as chromium obtained by ordinary fusion methods. No indications were obtained of a second or allotropic form of chromium, such as has been reported, and which, if present, might limit the applicability of chromium plate. The lattice parameter of the electrolytic chromium is in agreement with precise measurements previously reported for ordinary chromium.

*Abstract of a paper read at the Philadelphia meeting of the American Chemical Society, April 28-30, 1927.

Tin in the United States

To the Editor of the METAL INDUSTRY:

Your editorial in the April, 1927, issue on "Tin in the United States" shows a decided lack of information on the subject. The statement that "the foreign sources are closely held and not obtainable" is quite incorrect. You might acquaint yourself with tte tin interests of the National Lead Company and the Guggenheim Brothers, both American organizations.

Your discussion of the tin situation as a "dilemma" is amusing. Do you also discuss the aluminum situation as a "dilemma" of the same sort, or the magnesium possibilities, or tungsten and a number of other metals?

As to tin cans for food products, I will refer to an article by Mantell and Lincoln in the February issue of Canadian Chemistry and Metallurgy, where the situation is fully dicussed from the corrosion viewpoint. It might interest you to know that "tinless cans" have been a commercial product for some time. A glance at the March 24th issue of Iron Age might be informative to you.

With a little care taken in regard to facts, your editorial might have been worth while.

C. L. MANTELL,
Consulting Chemical Engineer.

Brooklyn, N. Y.

In answer to your letter of April 14th:

We should like to point out the following facts, in answer to your objection to the statement that the foreign sources of tin are closely held and not obtainable.

On page 5 of circular No. 6018 of the Bureau of Mines, issued January, 1927, entitled "Tin Situation from a Domestic Standpoint," by J. W. Furness, the statement is made that Great Britain alone controls its source of tin.

On page 13 the statement appears concerning Bolivian tin ores that virtually all of the output is in the form of barilla or concentrate, *which is exported mainly to England for reduction.* (The italics are our own.)

On page 16, the following statement appears:

"For many years England has zealously guarded the marketing of tin. The two chief markets of the world are Singapore and London; the New York market is of minor importance. For many years the London Metal Exchange was practically closed to the marketing of tin other than that of British origin. The exchange ruled that 'other than Straits tin mined and smelted under the British flag was not considered as a good delivery.' A few years ago, when a shortage of Straits tin limited the field of marketing, the rules were changed; any tin running 99 per cent pure or better was considered a good delivery, and the present 'Standard' contract was adopted which permits tin from the Dutch East Indies to be marketed under the same conditions as Straits tin. The control exercised by London is due largely to the high organization of the sales agencies, and advantage is taken of the lack of any similar organization among purchasers who bid competitively. As an illustration, each day at Singapore the manager of the Straits Trading Company receives bids from international buyers. At a certain hour these bids are opened and whatever tin the company has for sale may or may not be allocated to the various bidders, the Straits Trading Company reserving the right to decide that if bids are not satisfactory it has no tin for sale. In establishing the daily price it seems a fair inference that the manager of the Straits Trading Company considers the visible supply of tin, the London price, the New York price and the needs of the bidder. The London Metal exchange cables offers daily to its various agents in New York. All the tin it sells is handled on a commission basis. Broadly speaking, no prices are made in New York, and consumers who wish to resell or to transfer their deliveries or commitments are compelled to carry out their transactions on the London exchange.

On page 17 the following statement appears:

"**British Control**—More than 50 per cent of the world's output is directly controlled by British interests, both governmental and private. Possibbly 20 per cent more is indirectly controlled by the British smelting monopoly. The only major sources uncontrolled are those of the Dutch East Indies, Siam and China, and of these a large part of the Dutch East Indies tin is now smelted by the Straits Trading Company (British) which also handles a part of the Chinese output, and resmelts and sells almost all of the Siam output. More than 98 per cent of the output of Bolivia is now smelted in Great Britain and Germany under the control of a British-American-Bolivian Company. Since the war, considerable tin has been purchased direct from the Straits Trading Company at Singapore, which bases its daily price upon the London and New York prices, as well as the needs of the purchaser."

On page 18 of the above report, the following appears:

"Great Britain sets the price ....."

On the same page the following statement appears:

"The National Lead Company of New York is associated with Williams-Harvey and Company of Great Britain and the Patino interests of Bolivia in the control of smelters in Great Britain and Germany. This association handles more than 70 per cent of the Bolivia tin."

In 1925, Bolivia produced about 22 per cent of the world's tin. From a rough calculation it would appear, therefore, that American companies share in the control of about 15 per cent of the world's output, practically all of which is smelted abroad.

It seems to us that if the Bureau of Mines is considered an authority, these statements prove that foreign sources of tin are closely held and not obtainable.

As additional evidence, we have the statement of H. T. Warshow of the National Lead Company, who writes as follows in an article, "Tin: An International Metal," published in Foreign Affairs for April, 1927:

"The commercial control of tin ore deposits by American citizens or American corporations has, however, been increasing in the last few years. The Guggenheim Brothers have been developing the Caracoles mines in Bolivia and in July, 1924, the Patino Mines and Enterprises, Inc., Consolidated, which owns extensive mines throughout Bolivia, became an American corporation. *But the prospect of the United States ever controlling a sufficient supply of tin to satisfy its full needs is beyond the hopes of even the most optimistic.*"

(The italics are ours.)

".....Even if there were a duty on tin metal, and the concentrates were smelted in this country, we would still be dependent upon the Straits Settlements for approximately 25,000 tons required by our tin plate industry, no other grade of tin having as yet fulfilled the exacting requirements of this industry."

Concerning your second paragraph, the tin situation is obviously a dilemma for the following very simple reasons:

1. Sources are almost entirely controlled outside of the United States.
2. The United States uses more than half of the output.
3. There seems to be no tin deposits in the United States.
4. The price of tin has been steadily rising and is for a period of years entirely outside of the control of the United States.

Whether aluminum, magnesium or tungsten fit into this category or not, is beside the point. The metal under discussion is tin.

As for tin cans for food products, we have read carefully your article in the Iron Age for March 24, 1927, before the editorial to which you objected was published.

We can hardly see how the tinless can can be said to have been a commercial product for some time. This statement may seem to hinge on the definition of the word "commercial," but the fact is that the tinless can has hardly scratched the market yet, even though, as you state, enameled or lacquered cans have been in use here and abroad, "the additional coating being made on tin plate."

It is entirely possible that the lacquered or enameled can will be the most economical and efficient substitute for the tinned can. At least we have no information to the contrary. Such a condition would be very desirable and we would be the last to belittle it. At this time, however, the lacquered can is far from being recognized generally, and no one can be taken to task (especially in such terms as you have used) for not hailing it as the savior of the American food packing industry.

We should like to ask how long the enameled or lacquered cans have been on the market? Approximately what percentage of all the cans made are of this character? Is the reason for the slow growth, which you mention in the last paragraph of your article, the difficulty of changing the mind of the public or the greater cost of the can?

We should like to point out also that on page 7 of the Bureau of Mines' circular mentioned above, the following statement is made: "An entirely satisfactory substitute for tin is not known. A possible substitute for tin plating is chrome-plating." If lacquered or enabeled cans are a commercial product, why were they not mentioned?

Engineering Specifications of Metals

At a meeting of the Manchester Metallurgical Society at the end of February, in London, England, an open discussion of considerable interest took place on the subject of "Engineering Specifications of Metals."

The discussion was opened by W. E. Millington, who viewed the matter from the consumer's standpoint, and stated that the preparation of a specification should be considered as effective when it stipulated the material required and the tests or inspection needed to insure that correct metals were being supplied. This compliance should not entail too much loss of time, or involve excessive cost to the producer. Some of the points to watch during the inspection were: That test bars are not made of different material from the casting, that if attached to the casting they were not subjected to different treatment, such as forging or other heat treatment, which includes chilling while the casting is slowly cooled. Original defects are not to be welded, burnt, or filled without the knowledge of the customer, who might require other than normal tests to be applied when deciding whether or not to reject a doubtful casting. The question of the best position in which to place a cast-on test-bar was raised, and it was considered advisable that it should be located about half the total depth of the mould. The method of effecting repair by burning was strongly deprecated, and regarded as most undesirable in the case of castings which were intended to carry important stresses. The effect of an over-rigid specification was usually to defeat itself, and the procedure suggested was that a certain amount of elasticity should be permitted, especially if some additional tests, such as hydraulic, should prove acceptance possible for the work intended. On the other hand, extreme rigidity should be applied when any suspicion of sharp practice was aroused. Microscopical examination was often valuable, but could not be readily specified. Such tests as those of fatigue and impact were often omitted from specifications, and yet they gave more dependable information than many other tests.

In introducing the discussion from the point of view of the manufacturer, J. S. G. Primrose claimed that, whilst standard specifications had served a useful purpose in some cases, there was also an evil side which sometimes exceeded the good. When specifications had to be set up, the members of the trade involved were often invited to submit what they thought were fair standards, and then a composite specification was framed, or a compromise reached, which more or less satisfied all the interested parties, but which did everything but create a specification which really specified. One of the results of enforced specifications which their advocates had not foreseen was the corrupt practices which had in many cases followed. The protest against weak standards was quoted as entailing "too much standardization and too little scientific method—that is, too little real union between science and industry."

After the long time spent in compromising over so-called standards, they were not satisfactory to either producer or user, as they rarely represented the highest class of material. It was less satisfactory manufacturing down to a specification than up to an ideal, in order to meet competition and remain in business. When a specification called for a minimum weight of material being used in producing an article, say allowing 50 per cent discard, and involving a definite process of manufacture, it demanded something which the buyer had no available means of proving. The dishonest maker, knowing this, took advantage, whilst the honest manufacturer would not resort to such practices, and thus lost the business. When complaint was made about not receiving the best quality, the natural reply was that it met the specification, and thus private concerns often got best results by purchasing standard goods from reputable concerns, apart from any specification.

The matter of difficulty in drawing up a fair specification was commented upon, involving a due amount of reasonableness for those who were honest traders and yet sufficiently rigid to exclude those who were not putting the best material into the work. Examples of this were quoted from actual experience and an instance quoted whereby an easy specification was stiffened up. This eliminated all the undesirable suppliers, and the good quality material suppliers were easily able to meet all requirements.—A. C. B.

Merits of Aluminum Pistons

Developments in the art of casting and heat treating aluminum alloys within the last six years and in the design of aluminum pistons within the last two years have resulted in the production of pistons that are close grained, free from porosity and blow-holes, that have twice the hardness of former aluminum pistons, and that will run with less clearance in the cylinders than any other type of piston yet produced, asserted G. D. Welty, research engineer of the Aluminum Company of America, at a recent meeting of the Buffalo section of the Society of Automotive Engineers.

Improvement in the art of casting the alloy of approximately 90 per cent aluminum and 10 per cent copper by forming the pistons in permanent molds instead of in sand molds has resulted in the production of between 25,000,000 and 30,000,000 such pistons since 1920, he said, and improvements in the heat treating process have played an important part in their success.

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Contents

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EDITORIAL

ELECTRO-PLATERS' CONVENTION

It is ample proof of interest in a cause or object of any kind when a group will pursue this object under unfavorable and adverse circumstances. No better example of this fact can be cited than the 15th annual convention of the American Electro-Platers' Society in Toledo, a report of which appears on page 285 of this issue. The weather was most unpropitious for a series of technical discussions. The extreme heat was such as to discourage any but the most zealous.

Perusal of the list of papers read will explain some of this interest. Extended sessions on chromium plating, descriptions of electrical equipment, methods of analysis, cleaning chemicals and methods, coloring methods and a host of other details featured the program, which was such as not only to attract listeners, but to make it imperative for them not to be absent.

Congratulations are in order to Mr. Van Derau, the winner of the Founders' Gold Medal for 1927; also to A. K. Graham, W. J. Kennedy, F. R. Nordman, E. J. Lovering and T. A. Gardner, who were awarded prizes for papers and exhibits.

The new officers, headed by J. H. Feeley, have a high mark set for them, but we have no doubt that they will carry on the good work. The next year promises to be one of the most interesting in the history of the American Electro-Platers' Society.

FOUNDRYMEN'S CONVENTION

For the first time in years the American Foundrymen's Association convention was held without exhibits. The Chicago meeting experimented with the idea of gathering together only the technical representatives of American foundries for the purpose of discussing their problems and without the additional attraction of the exhibition of new and improved equipment. As shown by the report of the convention on page 277 of this issue, the experiment has proved a great success.

It is particularly noteworthy that nearly 1,500 members and guests were registered. Also the technical sessions were even better attended than usual because the visitors were able to concentrate on these sessions without having their attention diverted by other interests. Add to this the fact that the meetings were held in Chicago, a large city, with hundreds of other attractions, and the hold of the foundrymen upon its members is strikingly shown.

The non-ferrous sessions were of a very high order and concentrated upon the practical aspects of foundry work. Molding, casting and production problems were widely discussed by leaders among those engaged in this work. General foundry problems, important however, in their bearing on non-ferrous work, also claimed attention. These were such subjects as core oils, test bars, foundry blacking and foundry sands.

The American Foundrymen's Association deserves high praise for its bold step in making this innovation and the courage of its officials has been vindicated. There is every prospect that the 1928 meeting which will be held in Philadelphia, May 12 to May 18, will bring out even greater interest, not only in the exhibits which will have the appeal of returning after an extended leave, but also in the technical sessions which have added to their stature.

FUTURE OF ELECTROCHEMISTRY

The recent jubilee meeting of the American Electrochemical Society which celebrated its 25th anniversary in Philadelphia was striking in a great many ways, but to us at least, in the evidence of the increased attention which this Society has been paying for a number of years to electro-plating problems. Of course, these are properly a division of electrochemistry, but at one time electro-plating was looked down upon by the laboratory as one of the lesser arts, and by the plant as the "nuisance department." Little attention was paid to it except to blame it for not only its own shortcomings, but those of others.

Electro-plating had shortcomings enough, but the advent and growth of the American Electro-Platers' Society has changed its character. The American Electrochemical Society has taken up its share of the burden and now has a flourishing division of electro-deposition. It is in no sense a rival of the Platers' Society as rivalry is impossible here. It is a friend and co-worker, bringing to bear the knowledge, training and experience of its members upon the problems of the plater and laying solutions before him.

Chemists have done well to go into electro-plating. They found a field with plenty of room for discovery. Needless to say electro-plating has also benefited. We look forward to the continued and increasing co-operation of the chemists and the platers in answering old questions and improving old methods.

METALS IN THE AIR

The marvelous transatlantic flights of Colonel Lindbergh, alone, and Clarence Chamberlin accompanied by Charles A. Levine, have been too widely hailed to need any further praise here. Aside from the daring of the flyers, the great gain for the world lies in the long stride

taken by aerial transportation and it is for more than the satisfaction of curiosity that the most important point in the discussion centers about the question, "To what is this advance due?"

Obviously the design of airplanes has been improved. There is small resemblance and almost no comparison between the early and the modern planes. Knowledge of effects of air and wind currents has gone ahead by leaps and bounds, due to improved methods of testing new designs in wind tunnels. The data gained thereby has raised airplane designing from an art in which all the data was empirical, to a science. Probably the greatest improvements, however, has been made in power plant, namely the motor. The new Wright Whirlwind airplane engine has given striking proof of its dependability, the one quality heretofore lacking in airplane engines.

To what is this quality due? Also improved design? Partially. But to a large extent, if not actually more than any other one feature, it should be credited to the materials used. This engine could not have been built 20 years ago or perhaps even 10 years ago. The metals and alloys obtainable at the time could not satisfy the demands made upon them.

The description of the non-ferrous metals used in this engine published in our June issue shows what an important part is played by aluminum, copper, brass and bronze. Even aluminum bronze, formerly the "bad boy" among alloys, impossible to control, is used in the valve seats, the rings which support the main roller bearings in the aluminum crankcase, the spark plug bushings, the exhaust flange studs and a number of other locations.

These flights are triumphs of human daring and human ingenuity, but this ingenuity has expressed itself not only in design but in the steady and rapid improvement in metals and their alloys. The metal industries can claim their full share of the conquest of the air.

LACQUER DANGERS

The recent report of the Department of Labor and Industry on the explosion and fire in the plant of the Briggs Manufacturing Company in Detroit, and the answer to this report by the Spray Painting and Finishing Equipment Manufacturers Association holds interest for every manufacturer and user of lacquers. The report on the causes of this catastrophe points out that the Briggs company used their best efforts to avoid fire and accident. An explosion preceded the fire showing that an explosive vapor mixed with air accumulates from the spray. None of the spray system was grounded. It is recommended that every spray gun and piece of apparatus about a spray booth be electrically grounded as there is a hazard that sparks may develop at the spray nozzles. In addition, it is recommended that spraying should be done in one-story buildings of fire-proof construction and that ventilation should be in excess of the maximum amount that will admit of ignition; also that exhaust vapors should not come near railroads or any other place where sparks or cinders might come in contact with the vapors.

In answer to this analysis Mr. Pitt, Secretary of the equipment manufacturers, states flatly that there is no probability of a static spark being generated at the nozzle of the spray gun and that it is not necessary to ground such equipment. He states that lacquers call for extraordinary safety measures, more than usually required for paints and varnishes; sufficient ventilation to remove vapors and protection against ignition from open flames and lights, exposed electrical connections or any other equipment likely to spark. He points out that the testimony of eye-witnesses taken after the fire proves the presence of an electric spark in the resistance coil over the top of a mercury vapor lamp.

We should like to hear from our readers of their experience with spray finishing equipment and the possibility of sparking at the nozzles. For their own sakes no precaution is too great to take no matter how remote the chance of trouble may seem. Obviously also, the lighting devices used in lacquering departments should be only of the totally enclosed and of the safest types.

PLATING HAZARDS

A case has come to our attention of the hazards of the plating industry which in its effect upon the individual involved was unhappy, and which should be given more than passing thought by the plating industry and the Department of Labor.

It seems that an electro-plater accepted a position with a firm in New York State which required him to dip his hands into a solution of nickel. He voluntarily took the position, knowing the work involved, and later acquired what was termed an occupational disease, presumably nickel itch. He was denied compensation for the poisoning by the referee who based his judgment on a court decision, which briefly and in simple terms, refused compensation in another case because the trouble was not caused by an accident.

The details of the legalities involved are neither here nor there. To be sure, regulations are necessary and a multitude of cases may require varied interpretations of those regulations. To the simple and uninformed layman however, such cases seem clear. A man goes to work and in the course of his work suffers disease. Should he be entitled to compensation? What does the American Electro-Platers' Society think about such a problem?

NEW BOOKS

Year Book of the American Bureau of Metal Statistics. Published by the American Bureau of Metal Statistics, 115 Broadway, New York.

The Year Book for 1926 is the 7th annual issue giving statistics on the production and consumption of copper, zinc, lead, gold, silver, antimony, arsenic, iron and steel, cadmium, tin, aluminum, etc. The Bureau is maintained co-operatively by American copper, lead and zinc producers and its reports are authoritative.

Copies can be obtained for $2.00. Reports are issued at shorter intervals to members and subscribers, details of which will be furnished by the Bureau.

Metal Industry Handbook and Directory. Published by Louis Cassier Company, 22 Henrietta Street, Covent Garden, London, W.C. 2, England. Size 6 x 9, 306 pages.

This is the 1927 edition of this handbook which is issued annually. It is a compilation of metallurgical data covering in a general way the following:

1. General Properties and Mechanical Treatment of Metals and Alloys.
2. Eletcro-plating, Finishing, Galvanizing, Pyrometry, Metal Melting, Testing Machines.
3. General Data and Tables (non-ferrous metals).
4. Data and Tables (iron and steel).

The Technique of Executive Control. By E. H. Schell. Published by McGraw-Hill Book Company. Size 5 x 7½, 143 pages. Price $1.75.

The aim of this book is to offer a concrete analysis of the problems that confront the executive in his relations with his subordinates, associates and superiors. It is an attempt to codify the work of the executive in a large organization, and to set down in detail, rules which formerly have been grouped under the head of "magnetism," "personality," etc. It is therefore, largely a manual of personal relations between the executive and the people who surround him.

To judge from this book alone the work of an executive consists entirely of "handling men." There is no hint of any details of business with which the executive must necessarily be familiar. However, it attacks a difficult problem, as it is always hard to set down intangible things, and it does handle this problem well.

Among the subjects discussed are the following: Stimulation; stabilization; time-saving; loyalty; authority; responsibility; discipline; control; promotion; dismissal; difficulties with employees; difficulties with superiors and associates.

Transactions of the American Foundrymen's Association for 1926. Volume 34. Published by the American Foundrymen's Association, Chicago. Size 6 x 9, 1225 pages.

This is the annual collection of the technical papers and the proceedings of the meeting held by the American Foundrymen's Association. This book covers the Detroit meeting held September 27-October 1, 1926.

Material on metals included in it, is as follows: Preliminary Report of Sub-Committee on Survey of Refractories in the Non-Ferrous Industry (with discussion); Aluminum Alloy Permanent Mold Castings (with discussion); Temperature Control in Aluminum Foundries (with discussion); Temperature Control in the Brass Foundry (with discussion); Pyrometer Control in a Brass Foundry (with discussion); The Use of Pyrometers in the Casting of Non-Ferrous Metals; A Thermocouple for Ladle Temperatures of Brass (with discussion); Visual Judgment of Non-Ferrous Metal Temperatures; Pyrometry of Molten Brass.

Standards Yearbook for 1927. Published by the Bureau of Standards, Washington, D. C. Size 6 x 9, 398 pages. Price $1.00. For sale by the Superintendent of Documents, Government Printing Office, Washington, D. C.

The Standards Yearbook represents an effort to present an adequate picture of the diversification and ramification of the standardization movement which has spread throughout the world with astonishing vitality during the 25 years that have elapsed since the establishment of the National Bureau of Standards. It contains outlines of the activities and accomplishments of not only this bureau and other agencies of the Federal Government and the states and municipalities but also of the American societies and associations of which standardization is a major or very important activity. Descriptions and illustrations are presented of all the fundamental national standards of the United States. Moreover, outlines are given of the various foreign national and the several international standardizing agencies.

TECHNICAL PAPERS

Lighting for Street Traffic Control. Edison Lamp Works, General Electric Company, Harrison, N. J.

The Manganese Situation from a Domestic Standpoint. By J. W. Furness. Circular No. 6034. Bureau of Mines, Washington, D. C.

Directory of Commercial Testing and College Research Laboratories. Miscellaneous Publication No. 90. Bureau of Standards, Washington, D. C.

Lighting Data. Illumination Terms. Edison Lamp Works, General Electric Company, Harrison, N. J. A list of terms and definitions used in illumination work.

Recent Developments in Burning Powdered Coal Under Steam Boilers. By Henry Kreisinger. A paper presented before the International Conference on Bituminous Coal.

The Making of Nickel Products by the International Nickel Company. By F. W. Manker, Surface Combustion Company. Published in The Iron Trade Review, November 25, 1926.

A description of the methods of manufacture of nickel and nickel products at the Huntington, W. Va., plant of the International Nickel Company. The equipment is discussed in great detail, particularly the heat treating furnaces.

Methods of Growing Large Metal Crystals. By Professor H. C. H. Carpenter.

This publication is a reprint of the Fourth Sorby Lecture It includes the following divisions: Methods of Growing Large Metal Crystals; Production of Single Crystals from the Vapor Phase; Preparation of Single Crystals from the Liquid Phase; Preparation of Single Crystals from the Solid Phase; Some Properties of Single Crystals.

Copies of the paper can be obtained from E. J. Thackeray. Department of Applied Science, St. George's Square, Sheffield, England. Price 1s.

Electrodeposition of Chromium from Chromic Acid Baths. By H. E. Haring and W. P. Barrows. Technologic Paper of the Bureau of Standards, Washington, D. C. No. 346.

A detailed study is made of the chromic acid plating solution and of the conditions for its operation and control. The three principal types of chromic acid bath which have been developed during the past 70 years are shown to be identical not only in initial behavior, but also in ultimate composition. The recent commercial success of chromium plating is therefore attributed not to any changes which have been effected in the composition of the bath, but to its more careful operation and control. It was found that minor improvements could be effected in the throwing power of chromic acid baths, but that there appears to be little possibility of materially improving this property which has hindered the more general adoption of chromium plating.

Wave-Length Measurements in the Arc and Spark Spectra of Zirconium. By C. C. Kiess. Scientific Paper of the Bureau of Standards, Washington, D. C. No. 548.

The arc and spark spectra of zirconium as emitted between electrodes of pure zirconium metal were photographed with the concave grating and quartz, prism spectrographs of the Bureau of Standards. The measured wave lengths in the arc spectrum cover the region from 4881 A in the blue to 9277 A in the infra-red, thus extending our knowledge of the spectrum more than 2,000 units beyond the longest Zr wave length heretofore observed. The arc spectrum in the regions investigated is superposed on a band spectrum in which the bands are shaded toward the red. The wave-length measurements of the spark spectrum extend from 2163 A in the ultra-violet to 6115 A in the red, and contain not only the lines of the singly ionized atoms but also those of doubly and trebly ionized atoms.

SHOP PROBLEMS

IN THIS DEPARTMENT WE ANSWER QUESTIONS RELATING TO SHOP PRACTICE

BLACK OXIDE ON SILVER

Q.—I would appreciate it very much if you would give me information on how to produce the black oxide on silver-plated metal caskets.

A.—There are several methods in vogue for the production of an antique silver finish on metal caskets. The most common is to oxidize with a hot polysulphide solution prepared from water, 1 gallon; polysulphide or sulphuret of potassium, 2 ozs.; temperature of solution, 180 deg. F. The solution should be applied to the casket with a sponge. It is advisable to heat the casket with steam while applying or immerse the entire casket in a dip solution. The relief work is done with hand-scouring brushes and pumice stone or powdered flint and water, and finally the surface is lacquered.

A second method is to silver plate; scour down; then spray a black lacquer on the silver to produce the imitation oxidized finish. It is customary to lacquer the casket first, then spray the black enamel lacquer afterwards. The casket should be dried by heat.—C. H. P. Problem 3,653.

CADMIUM PLATING

Q.—I am coming to you for some information. I would like to have you tell me how to handle light brass goods, after the work comes from the burnishing barrel, to be cadmium plated.

A.—We presume you refer to the Udylite process or what is commonly termed cadmium plating. There should be no difficulty in cadmium plating the small articles made of brass that have been previously ball burnished. If, instead of using soap as the lubricating or burnishing medium with the steel balls, you use soap bark, on the basis of 1 oz. per gallon of water, then after ball burnishing and thoroughly washing in cold water you should be able to cadmium plate direct without any additional cleansing. If you use soap in ball burnishing, you will have to cleanse the articles afterwards. For this purpose, you might re-tumble them in a solution consisting of water, 120 deg. F., 1 gallon; soda ash, 1 oz.; tri-sodium phosphate, 1 oz.; sodium cyanide, ¼ oz. After the cleansing and tumbling, wash in water and cadmium plate direct.—C. H. P. Problem 3,654.

CASTING PISTONS

Q.—Can you please tell me how the aluminum piston manufacturers obtain a Brinell hardness of 125 to 150 with a 500 kg. load with their regular piston alloy, which is about 90 aluminum, 10 copper and small quantities of magnesium and iron? What heat treatment do they use in obtaining this Brinell and also what is the exact alloy that they use?

A.—The aluminum piston manufacturers obtain the Brinell hardness by casting in an iron mold and by heat treating and aging. When these alloys are heat treated to a temperature of about 500 deg. C., quenched and aged, there is considerable improvement in their tensile properties and hardness. The ordinary quenching mediums are air blast, oil and water. The physical properties resulting from air-blast quenching are less than those resulting from liquid quench.

The Bureau of Standards recommends for most commercial aluminum castings, heating to 500 deg. C., two hours' natural cooling and aging for several days. In aluminum pistons it is necessary to heat treat, quench and age the casting so as to eliminate the effect of growth before the finishing of the casting.

In reference to the heat treating and quenching methods, as stated above, some use air, oil and water, but Dr. Zay Jeffries recommends fused sodium nitrate for a salt bath for heat treating and quenching. The heating may be done in a furnace or in a salt bath. The use of open flame is not satisfactory on account of non-uniformity of such means. The furnace can be heated with gas, oil, or electricity. Coke, coal or charcoal are not used owing to the formation of explosive mixtures when carbonaceous fuel gases come into contact with nitrate.

Some of the alloys used for pistons are: Lynite No. 122; 88¼ Al; 10 Cu.; 0.25 Mn.; 1.5 F. Magnalite; 91.5 Al; 6.5 Cu.; 0.5 Mg.; 1.5 Ni. These alloys are cast in permanent molds.—W. J. R. Problem 3,655.

COPPER SOLUTION

Q.—Would you kindly give me the best information on how to make copper solutions?

A.—One of the best copper cyanide solutions for your purpose should be prepared from the following materials:

Water	1 gallon
Sodium cyanide, 96-98%	3½ ozs.
Copper cyanide	3 ozs.
Bisulphite of soda	1½ ozs.
Caustic soda	½ oz.
Hyposulphite of soda	1/64 oz.

Temperature of solution, 80 to 120 deg. F., at 4 to 5 volts; anodes, soft, sheet copper. To prepare the solution, figure out how many gallons of solution you intend to prepare, then the amount of each material required to make up the solution. Put ⅓ of the water in the tank and heat it to 140 deg. F., then put in all the sodium cyanide, then the copper cyanide, and stir well. Now put in all the balance of the water cold; add the bisulphite of soda; then the caustic and hyposulphite of soda; stir well, and the copper solution will be ready for plating.—C. H. P. Problem 3,656.

GUN-BLUING LIQUID

Q.—Will you please tell me how to make a gun-bluing liquid? I cannot find a bluer to apply with a brush. I wish to re-blue wornout spots on guns, and also to blue push-buttons, plates, etc. I tried that formula you gave me for statuary bronze and it works splendid and I want to thank you.

A.—We presume that electric push-buttons and push-plates you desire to blue are made of sheet brass. If so, they should be polished to a lustre finish, as you would for bright brass finish. Cleanse them as usual. Prepare a solution of water, 1 gallon; hyposulphite of soda, 8 ozs.; lead acetate, 4 ozs.; acetic acid, ¼ oz. Heat to 180 deg. F., then immerse the brass articles in the solution until they become blue. Then remove, wash in cold water and warm water, then dry out in sawdust and lacquer as usual.

It is somewhat difficult to re-blue worn spots on sporting guns or pistols. It is just as easy to remove the old blue with muriatic acid, pickle dry thoroughly, rub down with emery and oil, cleanse with gasoline and re-blue. The following solution is used for the purpose: Water, 4 ozs., fluid measure; ferric chloride, 1 oz. by weight; denatured alcohol, 4 ozs., fluid measure. Add the alcohol last; mix thoroughly. Apply the liquid to the clean and bright gun barrels, etc., with a sponge, which should have the excess solution squeezed out. Apply the solution uniformly. Hang up the articles in a heated chamber that is kept moist with a little live steam for an hour or so. Hang up over a hot water rinsing tank so that the steam from the water comes in contact with the articles. A reddish rust will develop. Then immerse the articles in clean, boiling water for 15 minutes; dry direct from the boiling water. When cool, scratch brush the articles lightly with a soft steel wire scratch brush. The gun metal blue will then result. Finally, wipe with a cloth moistened with boiled linseed oil or a beeswax paste; avoid an excess. If the color does not develop with the first treatment, then it may be necessary to apply a second or third application of the solution with the sponge before the final scratch brushing and oiling or waxing.—C. H. P. Problem 3,657.

PLATING ON ALUMINUM

Q.—Can aluminum be plated with satisfactory results? If so please give me, step by step, a solution for plating aluminum.

A.—You do not mention the nature of the metal you desire to deposit upon aluminum. If nickel, then polish the aluminum surface under usual commercial polishing and buffing conditions to produce a lustre finish. Remove excess of grease, etc., by cleansing in gasoline or benzine or heated kerosene. Next cleanse in any reliable alkaline cleaner heated to 180-200 deg. F., until the aluminum is perceptibly darkened, then remove, wash thoroughly in cold water; immerse in the acid passive dip for a moment or two, prepared as follows:

Nitric acid 38°	1 gallon
Sulphuric acid 66°	1 gallon
Ferric chloride of iron	2 ozs.

Dissolve the latter in 8 ozs. hot water first, then mix in the acids. After immersing the cleansed aluminum in the passive dip as outlined, remove quickly, wash in cold water and then nickel plate direct in any good nickel solution. You can use the nickel surface as a base for other metals such as copper, brass, silver, gold, etc.

Or you can deposit zinc upon the aluminum surface by the aid of a special zinc cyanide solution consisting of:

Water	1 gallon
Sodium cyanide, 96-98%	6 ozs.
Zinc cyanide	4 ozs.
Caustic potash	2 ozs.
Soda ash, 58%	2 ozs.
Aqua ammonia	1 oz.

Anodes, sheet or cast zinc. Voltage 4 to 5. Temperature 120°-140° F.—C. H. P., Problem 3,658.

RED BRASS DEPOSIT

Q.—Every casting I plate in brass turns red. Please advise remedy for stopping this. I would also like to know how to make the brass plate look uniform.

A.—We presume you have added an excess of zinc to your brass plating solution in an effort to bring the color to a normal brass. If this is true then you have produced what is termed a "zinc red" that approaches a bronze in tone. It may be necessary to add more copper to the solution to balance the excess of zinc you have, no doubt, added. We suggest the following additions to the solution to produce a satisfactory brass color.

1. Add 2 ozs. bisulphite of soda per gallon of solution and 1 to 1½ ozs. sodium cyanide. These additions will bring up the copper in solution.

2. After these additions have been made, if the brass is still a reddish tone, then dissolve 2 ozs. copper cyanide and 2 ozs. sodium cyanide in each gallon of solution. Dissolve the sodium cyanide first in hot water, just as little as possible, then add the copper cyanide, adding half the amount first and then if necessary, adding the balance or the entire 2 ozs. of cyanide and copper per gallon.

Try out a ten-gallon test solution first with the additions given. If the brass shows up a good color afterwards, but is patchy and cloudy, the addition of ½ to 1 oz. sal-ammoniac per gallon of solution will be advisable. We believe these additions will result in an excellent brass color upon your product.—C. H. P., Problem 3,659.

REINFORCED TUBE FOR BUS BARS

Q.—Kindly advise if good results can be obtained by using ¾" tubing with iron rods inside, for plating rods on tanks. We have a 5 volt, 125 ampere generator, and wish to work a cyanide-copper (75 gallons), brass (120 gal.), silver (50 gal.) and black nickel (70 gal.) solutions.

We want to plate cast iron bases for floor lamps; also advise whether articles to be dipped in gold, first require a brass plate.

A.—You do not mention whether the ¾" tubing you intend to use is copper or brass. We presume, however, that it is brass. You can reinforce the tubing with iron rods to give strength without any adverse results as long as you have ample electric current at your disposal. No. doubt, the formula you intend to use is taken from "Platers' Wrinkles." If so, it will give you good results. It is possible to use a gold immersion dip if you brass plate the cast iron bases or similar products uniformly, with a good yellow brass which should be scratch-brushed or buffed previous to immersion in the gold solution.

It is our opinion that you will obtain more uniform results if you use an electro-gold plating solution instead of an immersion solution which is best adapted for articles made of sheet or solid brass.

Gold plating solutions mentioned in "Platers' Wrinkles" will give desired results.—C. H. P., Problem 3,660.

SATIN FINISHED NICKEL

Q.—We are desirous of installing a nickel plating outfit for the purpose of putting on a satin finish nickel on steel stampings, nickel plating in a mechanical way, if possible. We would appreciate hearing from you, giving us a correct formula and detail information for getting a finish in this manner.

A.—We presume you intend to install a mechanical plating barrel for nickel plating your steel stampings together with other necessary equipment, such as dynamo, cleansing solutions with necessary tank, cold rinsing water tanks, as well as hot water tanks, etc. In addition to this equipment you will require a ball burnishing barrel to brighten up the steel stampings before nickel plating. It will not be necessary, however, to use steel balls, as the friction of the steel parts, one against the other, will give sufficient polish.

You can purchase the necessary equipment from dealers in electro-plating equipment, advertising in THE METAL INDUSTRY. First cleanse the steel parts of oil, grease, etc., in hot alkaline cleaners. Then free from surface scale and rust, etc., with acid pickles prepared from sulphuric acid 1 part, water 5 parts, common salt 2 to 4 ozs. per gallon of water and acid; or equal parts of muriatic acid and water. The stampings should afterwards be thoroughly washed in water and tumbled in water, 1 gallon; soda ash 58%, 3 ozs.; sodium cyanide, 96-98%, ½-oz. The stampings should be tumbled in this solution from 30 to 60 minutes, then washed thoroughly in clean cold water and nickel plated direct.

For nickel plating, we suggest the following formula:

Water	1 gallon
Single nickel salts	20 ozs.
Nickel chloride	2 ozs.
Ammonium chloride	2 ozs.
Boracic acid	2 ozs.
Epsom salts	10 ozs.
Cadmium chloride	4 grains

Prepare the solution in the order given, using half the water first at 180 deg. F. to dissolve all materials except the Epsom salts.

Add the remaining half-gallon of cold water, then the Epsom salts, with constant stirring. To maintain the bright nickel deposit constant, it will be necessary to add half of the cadmium chloride specified per gallon at intervals when the nickel deposit becomes dull; also, an addition of 1/16 oz. muriatic acid per gallon of solution every second day. The upkeep of the nickel solution should be on the basis of: 16 ozs. single nickel salts; 2 ozs. nickel chloride; 1 oz. boracic acid, adding as many pounds of this combination as may be required per week to maintain the nickel solution or solutions in constant operation. These suggestions will enable you to obtain excellent results. We have not mentioned the washing and drying operations after nickel plating, but we presume you are familiar with the correct procedure.—C. H. P., Problem 3,661.

SILVERING MIRRORS

Q.—I am very much interested in silvering mirrors and resilvering old mirrors on a commercial scale. What solution must be used? What treatment does the glass require before silvering on new mirrors? Must the old silver be stripped off old mirrors, and how? Should the room be warm, or some drying system be used?

A.—We would suggest that you read the article, Resilvering of Mirrors, by Charles H. Proctor, THE METAL INDUSTRY, May, 1923, page 193.—C. H. P., Problem 3,662.

PATENTS

A REVIEW OF CURRENT PATENTS OF INTEREST

1,626,925. May 3, 1927. **Alloy.** Vahan Fener, Chicago, Ill.

An alloy comprising copper in the proportion of substantially 100 pounds to tin varying from 3 to 25 pounds, modified by the addition of ammonium chloride approximately one pound, and potassium ferrocyanide varying from 5 to 25 drachms while the metals are in molten condition.

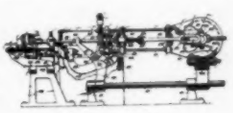
1,627,152. May 3, 1927. **Burnishing and refitting Tool for Bearings.** Charles E. De Witt, Dallas, Texas, assignor to V. H. Barwood Manufacturing Co., Lynn, Mass.

A device for burnishing, refitting and gauging bearings of Babbitt or other soft metals, including a tapered mandrel having integral threaded end portions; a series of elongated rollers spaced around the mandrel; centrally apertured circular plates having inwardly facing annular channels therein, disposed on either end of said mandrel and receiving the ends of the rollers in said channels; an elongated, expansible sleeve slidable over the tapered body of said mandrel; a nut disposed on the threaded portion of one end of the mandrel and having a flange thereon extending through the bore of one of said circular plates and impinging one end of said expansible sleeve, and means on one end of said mandrel for gauging the action of the rollers on the bearing.

1,627,351. May 3, 1927. **Process of Treating Discarded Lead Battery Plates,** Alexander Stewart, Roselle, N. J., assignor to C. L. Constant Company, Hoboken, N. J.

The process of treating discarded lead battery plates, which consists in heating to a molten condition the said plates directly with a dry salt capable of converting substantially all the peroxide of the paste portion thereof into a salt separable from the metallic portion of the plates.

1,627,784. May 10, 1927. **Die-Casting Machine.** Torbjorn Conrad Korsmo, Madison, Wis., assignor to Madison-Kipp Corporation, Madison, Wis.



The combination with a die casting machine of the type in which the molten metal is forced into the die by gas under pressure entering through a pressure connection, of a movable abutment interposed in said connection and controlling flow therethrough; and means for regulating the movement of said abutment.

1,627,900. May 10, 1927. **Process of Coating Aluminum Surfaces.** Edward Hallsted Hewitson, Rochester, N. Y., assignor to Eastman Kodak Company, Rochester, N. Y.

In the process of coating an aluminum surface, the step of treating said surface with a solution of a zincate of an alkali metal until said surface is coated with zinc, said solution containing a protective colloid which increases the density of said zinc.

1,628,050. May 10, 1927. **Alloy.** Charles A. Kraus and Conrad C. Callis, Worcester, Mass., assignors to Standard Development Company, a Corporation of Delaware.

The process of making an alloy of lead and sodium, which comprises electrolyzing sodium chloride to produce molten sodium and combining the sodium with lead in the electrolytic bath, while preventing access of oxygen.

1,628,141. May 10, 1927. **Cleaning Device.** Hiram Liggett Gray, Scarsdale, N. Y., assignor to Oakite Products, Inc., New York, N. Y.

A device for cleaning the interior of tanks comprising a traveling foldable support, a sprayer mounted upon said support and a hose connection whereby said sprayer is connected with a source of material to be sprayed and whereby said support is pulled along to progressively advance the sprayer in the direction of pull.

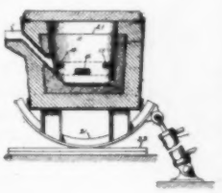
1,628,149. May 10, 1927. **Manufacture of Malleable Nickel.** Noak Victor Hybinette, Ottawa, Ontario, Canada.

The process of producing malleable nickel by electro-deposition, which comprises maintaining the electrolyte in condition by withdrawing it from the electrolytic tank, subjecting it to a boiling operation, and returning it for further use.

1,628,190. May 10, 1927. **Method of Producing Finely-Divided Nickel.** Murray Raney, Chattanooga, Tenn.

A method of preparing a catalytic material which includes the step of alloying the same with aluminum and dissolving the aluminum from the resultant alloy, whereby the catalytic material remains in finely divided condition.

1,628,375. May 10, 1927. **Apparatus for Refining Metals.** Magnus Unger, Pittsfield, Mass., assignor to General Electric Company, a Corporation of New York.



A crucible for molten metal comprising refractory material forming a reservoir for the charge and an annular channel in which a portion of the charge forms a closed secondary, said refractory material providing two openings spaced in a direction at right angles to the axis of said channel connecting one end of said channel with said reservoir, and a single opening connecting the opposite end of said channel with said reservoir.

1,628,610. May 10, 1927. **Paper for Preventing Tarnishing of Polished Metals.** Fay H. Osborne, Windsor Locks, Conn., assignor to C. H. Dexter & Sons, Incorporated, Windsor Locks, Conn.

An article of manufacture for protecting polished metal articles against tarnishing, consisting of paper treated with zinc acetate.

1,628,673. May 17, 1927. **Silver Alloy.** Robert H. Leach, Bridgeport, Conn., assignor to Handy & Harmen, a Corporation of New York.

An alloy containing a preponderating amount of silver about 7.5% of cadmium and antimony, the cadmium ranging from about 1% to 7% and the antimony from about 6.5% to 0.5%.

1,629,072. May 17, 1927. **Composition for and Method of Coating Metal Surfaces.** Ralph R. Danielson, Chicago, Ill.

A composition for use in protecting metallic surfaces in selective carburization comprising, 100 parts of frit, prepared by sintering at 800° C. to 900° C., a mixture of 64.90 parts of flint, 36.96 parts of borax, 6.95 parts $NaNO_3$ and 8.17 parts Pb_3O^4, powdering the resulting mass and sifting the powder; mixed with 93 parts of enamel clay, and sufficient water to bring the mixture to the consistency of an ordinary enameling composition.

1,629,212. May 17, 1927. **Process and Apparatus for Recovering Silver from Photographer's Spent Hyposulphite Solution.** Ernest K. Giffen, Salida, Colo.

A process for the recovery of silver from spent hyposulphite solutions which comprises immersing elements in remote relation in the solution to form a voltaic cell and connecting said elements externally through an ohmic resistance which will maintain the maximum voltage between said elements during deposition of silver upon one of said elements.

1,629,417. May 17, 1927. **Press for Pressing Hollow Bronze Objects.** Alwin Schmitz, Erfurt, Germany.

A press for forming hollow objects, comprising a matrix for determining the cross sectional dimension of the object to be formed, a counter-socket arranged within said matrix and adapted to rise against the pressure of the extruded material as the latter rises in the matrix under the pressure of a punch, and brake means exercising a retardative control upon the rise of said counter-socket and imposing a counter-pressure upon the extruding material so as to prevent said material from cracking and at the same time condensing it.

1,629,699. May 24, 1927. **Process of Improving Aluminum Alloys.** William Guertler, Charlottenburg, and Wilhelm Sander, Essen, Germany, assignors to the Firm: Th. Goldschmidt A.-G., Essen, Germany.

A process for producing alloys of high tensile strength comprising alloying aluminum with $MgZn_2$, said compound forming from 4% to 26% by weight of the alloy, and subjecting the alloy to annealing, quenching, and ageing.

EQUIPMENT

NEW AND USEFUL DEVICES, MACHINERY AND SUPPLIES OF INTEREST

NEW FLOODLIGHT PROJECTOR

A new 24-inch floodlight projector, known as the Type SCA-24, has been developed by the Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa., particularly for railroad yard lighting and similar applications where long throw and high beam candle-power are essential. The large diameter of the reflector in the new floodlight makes possible a wide angle of light with high overall efficiency. Its long focal distance gives good beam concentration for long range work.

The 24-inch parabolic chromium plated brass reflector is mounted in a cast aluminum alloy frame with a spun sheet aluminum back. The lens, of heat resisting glass, is held in a door which opens from the front swinging sideways. Thus, it is possible to renew lamps and clean the reflector without interference from the door.

The floodlight is mounted so that it can be tilted upward where its position is such that approach from the front is not practical. A stop is provided so that it is unnecessary to aim the projector each time it is moved from position. Focal adjustment is provided by three screws, which operate independently, two for "in" and "out" and lateral motion of the lamp, and one for adjustment of focal distance.

The reflector is entirely enclosed, no ventilation being required. It is furnished with either narrow or wide beam projector and with either a plain or spread lens. The visor is supplied as an accessory.

WESTINGHOUSE FLOODLIGHT PROJECTOR

HAND GRINDER AND BUFFER

The Cincinnati Electrical Tool Company of Cincinnati, Ohio, has recently brought out its Model NSU universal hand grinder and buffer. It is claimed to be a particularly handy tool for the foundry, welding shop, garage, ornamental iron or industrial plant, in fact, wherever it is easier to take the tool to the work rather than the work to the tool.

This machine is equipped with a ¾-hp. motor and carries a

UNIVERSAL HAND GRINDER

6" x 1" grinding wheel, revolving at a speed of 3,600 r.p.m. Although the construction of the tool throughout is correspondingly heavier, simplified design has resulted in a weight increase of but 1 lb. over the ½-hp. model. It is of full ball-bearing construction, both armature and spindle being so mounted. Extra broadface spiral gears, heat-treated and hardened, are used throughout. The armature pinion is removable, being screwed into the armature shaft and all gears run in grease in a grease-tight compartment.

The end handle cover contains no mechanical parts and is so made as to relieve the motor and motor bearings of all friction load and pressure. This is accomplished by fitting the cover over the specially designed combination brush-holder base and ball-bearing support. The fully-enclosed patented switch is located in the handle of the grinder, with push-trigger under immediate control of the operator at all times. It is of the quick make-and-break type and may be easily reached by the removal of but four screws.

Another new feature is the cable clamp securing the drop cord and its protecting hose against movement and resulting wear. The wheel guard is both longitudinally and radially adjustable. The weight of the Cincinnati Type NSU hand grinder and buffer is 24 lbs., including wheel and wheel guard. It can be furnished wound for 32, 110, or 220 volts, for both direct and alternating current

ELECTRIC SIREN

How may a start- and quit-work signal be sounded in an industrial plant so that it will not be mistaken for other signals?

Bells, gongs, steam and compressed air whistles are widely used to notify workers when it is time to start or quit work, but how often does the worker confuse this type of signal with some other noise? Quite frequently. There are bells for this, gongs for that, whistles for everything from a peanut stand to a locomotive. Signals ringing or blowing throughout the day may be confused easily with the regular start- and quit-work signal.

Many plants have solved this problem with a Federal Electric ⅓ horsepower siren installed inside the plant, or a 5 horsepower siren erected outside the plant. The siren's distinctive, penetrating sound rises above the din of ordinary signals and is recognized instantly as the start- and quit-work signal. And the men get to work on time.

The saving in time thus effected by getting the workers to their places on time, and the resulting increased production, may pay for the siren in a short time. For example, one minute per man saved each day for one week in a plant of, say, just fifty workers, totals 1,800 minutes, or 30 hours a week. With an average rate of 50c. an hour, the time lost in wages is $15. Now add to that the loss of 30 hours' production and you have the loss over one week's time at one minute per man per day.

It was with that fact in mind that the Aluminum Company of America, American Rolling Mills and hundreds of other industrial plants installed electric sirens.

Electric sirens are used not only as a start- and quit-work signal, but as a fire alarm and a general emergency alarm for other purposes as well.

One of the outstanding advantages claimed for the 5 horsepower siren is that it may be had to sound code signals. So, in addition to being used as a start- and quit-work signal for an entire plant, it may be used also during working hours to not only sound the alarm but to tell, by code, where a fire is.

The Federal siren is made by the Federal Electric Company, 8700 South State street, Chicago, Ill.

ELECTRIC MELTING POT

To facilitate the pouring of large babbitted bearings the Harold E. Trent Company of Philadelphia has recently supplied a large steel company with a 750 lb. electrically heated babbitt melting pot, with pouring spout and tilting mechanism, complete with an automatic temperature control, as illustrated.

The design closely follows that of the standard Trent melting pot having a special cast iron crucible, steel case, heavy insulation, etc. The special feature of these tilting type pots is the application of the temperature control, which is so placed as to control the temperature, no matter what the position of the pot.

The consant use of the temperature control is of importance during the whole operation of melting and pouring bearings, so as to insure correct heating of the babbitt right up to the time it is poured in the bearings. The best service is often not obtained from babbitted bearings due to the fact that the metal is overheated while being melted, and eventually poured too cold. Therefore, with the correct temperature maintained, the ideal conditions for melting and pouring babbitt are realized in practice.

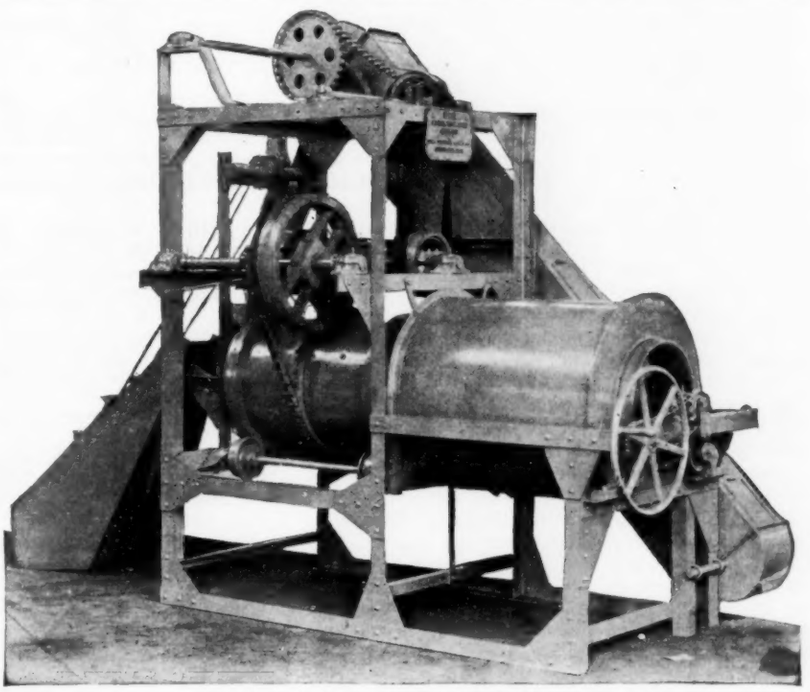
The tilting mechanism is operated by means of a hand wheel conveniently placed. Special attention has been given to the construction of the worm gear drive, which makes the pot easy to tilt, yet positive in action. These pots are arranged for single, two or three phase circuits.

TRENT 750 LB. BABBITT MELTING POT

SAWDUST TUMBLING BARREL

The Ideal Concrete Machinery Company, Cincinnati, Ohio, is making a special sawdust tumbling barrel, in addition to its regular line of machinery for tumbling, washing, drying, separating and burnishing. In this machine, the work is loaded into the barrel through a power loader and held in the barrel, tumbling as long as necessary. It is then discharged through the screen by turning a hand wheel, which opens the plug or valve at the discharge end of the barrel.

The sawdust falls through the screen, is dragged over a steamheated conveyor to be heated, dried and returned to the barrel for tumbling in the next charge. In this fashion the work goes into the barrel, is tumbled and discharged. The sawdust goes out with the work, is dried, heated and returned to the barrel again without taking any additional operations.



IDEAL SAWDUST TUMBLING BARREL

NEW BELKE FILTER

The Belke Manufacturing Company has recently completed a new model filter. The new filter is in cylinder tank form and gives a filtering area of twenty-four square feet, by means of twenty-four double discs through which the solution flows. It is called the Multidisc filter.

In operation, the liquid is forced, by means of the standard Belke self priming pump, into the tank which is entirely sealed except for the outlet on top. The liquid seeps through the twelve double discs, each set of which is covered with high grade felt. After entering the inside of the double discs, the solution finds its way to a center shaft and goes out at the top, from which it can be led to tanks.

It is stated that cleaning of the filter discs is simple. The discs are not permanently attached to the center shaft, but by a unique arrangement, each disc, combined with a collar, serves to form the center shaft. Therefore, the discs are very easily removed, and cleaned, and working parts are foolproof.

This filter can be used as a stationary piece of equipment to be set by each tank for permanent filtration, or it can be set on a movable platform with the pump and used to filter all tanks as a portable unit. It is stated that the apparatus will filter over 1,000 gallons per hour.

This filter is not intended to replace the Belke self-cleaning filter which functions under other conditions. It is simply an addition to the Belke lines.

SOFT METAL FURNACES

Charles A. Hones, Inc., Baldwin, L. I., manufacture a line of gas-burning furnaces, using their special "Buzzer" burners. A line of furnaces for lead melting includes the No. 60, No. 61 and No. 150. No. 60 has a capacity of 60 pounds of lead, to be melted in 15 minutes, using 2 burners. No. 61 uses only 1 burner, and takes 30 minutes for the same amount. No. 150 uses 3 burners, and will melt 150 pounds of lead in 20 minutes.

These furnaces all have removable pots and jackets.

CORROSION RESISTANCE OF ALUMINUM BRONZE

Aluminum bronzes as manufactured by the members of the Aluminum Bronze Manufacturers' Institute, Washington, D. C., vary in composition to a certain extent and while they are all properly named aluminum bronze, the composition of the alloys is varied to meet certain metallurgical specifications or specific physical requirements. These variations in composition will have some effect on the resistance to corrosion.

It cannot be assumed that any one specific composition of aluminum bronze is necessarily superior to the others in resistance to every corrosive. As an example, an aluminum bronze consisting of 89 per cent copper and 11 per cent aluminum is possibly superior to other compositions for resistance to weak solutions of sulphurous acid, while a bronze containing a lower percentage of aluminum and an appreciable addition of iron is more resistant to weak sulphuric acid. The difference in resistance, however, is not great and the general statement has been made that aluminum bronzes containing at least 7 per cent aluminum are extremely resistant to the following list of corrosives at room temperatures:

Acetic Acid
Aluminum Chloride
Aluminum Sulphate
Ammonia Liquors
Ammonium Chloride
Ammonium Phosphate
Ammonium Sulphate
Ammonium Sulphide
Atmospheric Corrosion
Barium Chloride
Boric Acid
Calcium Hypoclorite
Caproic Acid
Carbon Tetrachloride
Cyanides
Embalming Fluids
Ferrous Chloride
Ferrous Sulphate
Formic Acid
Hydrobromic Acid
Hydrochloric Acid*
Hydrofluoric Acid
Hydrofluosilicic Acid
Hydrogen Sulphide
Nickel Sulphate
Oleic Acid
Oxalic Acid
Photo Developers
Sea Water
Sodium Bisulphite
Sodium Carbonate
Sodium Chloride
Sodium Hydroxide
Sodium Sulphite
Stearic Acid
Sulphur Dioxide
Sulphuric Acid**
Sulphurous Acid
Tannic Acid
Titanic Acid
Zinc Chloride
Zinc Sulphate

* With cold, or weak hot solutions.
** 60° Bé and under at 80° C.
** 45° Bé and under at 132° C.

Aluminum bronze, it is stated, can be used satisfactorily with many other corrosives and specific information may be obtained by writing to the Aluminum Bronze Manufacturers' Institute at 810-18th street, Washington, D. C.

With many acids these bronzes can be used even at elevated temperatures. It is claimed that they satisfactorily resist the corrosion of sulphuric acid of 55° concentration or less at the boiling point of the solutions. As an example, with a 25 per cent solution of sulphuric acid which boils at 223° F. the loss expressed in inches depth of corrosion per year will not be over 0.010". Similar figures are available under many other conditions.

There are certain corrosive conditions for which aluminum bronzes are not recommended. Among these are:

Calcium Sulphide
Chlorhydrin
Chromic Acid
Copper Sulphate
Ferric Chloride
Ferric Sulphate
Fluorine
Hydrochloric Acid†
Mine Water
Nitric Acid
Sodium Hypochlorite
Sodium Sulphide
Stannic Chloride
Stannous Chloride
Sulphuric Acid††

† Concentrated hot.
†† Above 45° Bé at 132° C.
†† Above 60° Bé at 80° C.

LINCOLN ARC WELDING PRIZE FOR 1927

As a guide to competitors in the Lincoln Arc Welding Prize for 1927, consisting of $17,500, given by the Lincoln Electric Company of Cleveland, Ohio, and administered by the American Society of Mechanical Engineers, 29 West 39th street, New York City, the donors have expressed the following suggestions:

Practicable, workable ideas will get more consideration than ideas in which the practicability is open to question. The problem is to develop or extend the field of usefulness of electric arc welding and make material and labor savings by its use. The object of each entrant should be to make concrete and practical application of the known facts and principles. The application should preferably be made in the field in which the entrant is at present engaged, so that accumulated knowledge in that field will be available and that the chance of the suggestion being impractical will be reduced to the absolute minimum.

It is probable that the entrant will find that the best way to go at the job will be to study all of the technical literature available on the subject of electric arc welding, then apply the facts and principles to his own business or branch of engineering activity.

The principles of application of electric arc welding described in the preceding discussion are applicable not only to steel but also to the non-ferrous alloys. The rapidity with which new alloys are being developed and made useful to the industry makes this field of electric arc welding very important.

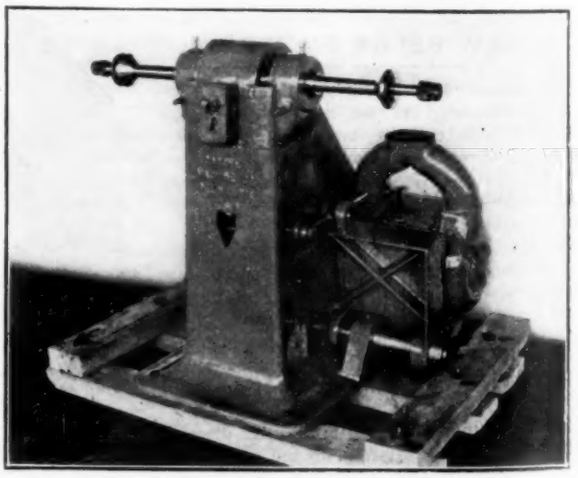
It is now technically possible to weld aluminum, and it appears reasonable to assume that the application may be carried into the aluminum alloys, such as Lynite and Duralumin. In the case of the latter alloy, it is only necessary to point out that the frame of the giant Los Angeles is made of Duralumin, riveted together, to indicate the possibilities of weight saving by welding. A weight reduction of possibly 30 per cent in the frame of the drigible might be expected if practical welding methods may be devised.

The winners of the Lincoln Arc Welding Prize for 1927 will be largely selected on the basis of amount of economic saving that the suggestion submitted shows, either directly on the design submitted or in its possible wider application. All suggestions should be made with that in mind.

The Lincoln Electric Company stands ready to assist anyone by suggestions or data upon receipt, and further information can be secured from either that company, in Cleveland, Ohio, or from the American Society of Mechanical Engineers, 29 W. 39th street, New York.

MOTOR DRIVEN POLISHING LATHE

The Gardner Machine Company, Beloit, Wis., has developed a new motor-driven polishing lathe. The chief distinctive feature



GARDNER POLISHING LATHE

claimed for this machine is the mounting of the motor on a hinged bracket at the rear of the base.

Another feature is the fact that almost any spindle speed may be secured. The motor is belted to the machine spindle, and speeds can be governed by the diameter of the pulley used on the motor shaft. The belt is fully enclosed with a heavy sheet metal guard and is made to run absolutely tight at all times, since motor adjustment is provided to take up all the stretch.

EQUIPMENT AND SUPPLY CATALOGS

Apollo **Nickel Zinc.** Apollo Metal Works, La Salle, Ill.

Saving **Money Pumping Acid.** Duriron Company, Dayton, Ohio.

Rockwell **Hardness Testers.** Wilson-Maeulen Company, Inc., New York.

Motor **Drives for Rolling Mills.** General Electric Company, Schenectady, N. Y.

Long **Pipe Lines with Oxwelded Joints.** Linde Air Products Company, New York.

Spring **Winding Tool.** Superior Spring Winding Tool Company, Milwaukee, Wis.

Air Valve Foul Proof Spark Plug. Air Valve Ignition Company, Loveland, Colo.

Mueller Brass for Electric Refrigerators. Mueller Brass Company, Port Huron, Mich.

The Correct Hardening of Tool Steel. Automatic and Electric Furnaces, Ltd., London, England.

Modern Manufacturing with the "Stable-Arc" Welder. Lincoln Electric Company, Cleveland, Ohio.

Functions of the Purchasing Agent. Policyholders' Service Bureau, Metropolitan Life Insurance Company, New York.

New Comal Power Plant in Texas to Burn Pulverized Lignite. Combustion Engineering Corporation, New York.

Galvanometers. Catalog 20, embracing the entire line of these instruments made by Leeds and Northrup Company, Philadelphia, Pa.

Facts on Soldering. An unusually informative booklet on soldering, covering compositions, methods and tools. Chicago Solder Company, Chicago, Ill.

Hardness Testing of Metals. A compendium of possibilities and current practices with the Rockwell hardness tester. Wilson-Maeulen Company, Inc., New York.

Worm Gears and Drives. Bulletin E., covering a new line of worm gear speed reducers equipped with Timken roller bearings. Fawcus Machine Company, Pittsburgh, Pa.

General Electric Publications. Station Oil Circuit Breakers; Selsyns for Distant Signaling, Control and Indication; Induction Motor Panels, Isolated Type; Solenoid-operated Air Circuit Breakers; Drum Controllers, General Electric Company, Schenectady, N. Y.

ASSOCIATIONS and SOCIETIES

REPORTS OF THE CURRENT PROCEEDINGS OF THE VARIOUS ORGANIZATIONS

NEWARK BRANCH

HEADQUARTERS, CARE OF ROYAL F. CLARK, 55 SEYMOUR AVE.

Newark Branch held its first meeting of the new fiscal year on June 3, with George Onksen presiding and 20 members present. John Moriarty was elected to active membership. Horace Smith, past president, very ably installed the newly elected officers. Charles H. Buhler, on assuming the president's chair, responded with fitting remarks. Each officer was called upon for a few words and responded.

Samuel Glickenhaus, librarian, spoke on the topic for discussion, "Salt Water Gold Plating," from its early application to the present-day practice. Messrs. Sizelone, Bohler, Calabrese and Brunswick gave their methods of installation and manipulation, which were very instructive.

A. Dulje spoke on the deposition of tin, using pure tin anodes at a temperature of 130 to 160 deg. F. He exhibited excellent specimens.

NEW YORK BRANCH

HEADQUARTERS, CARE OF J. E. STERLING, 2595-45 STREET, ASTORIA, LONG ISLAND, N. Y.

The June meetings of New York Branch of the American Electro-Platers' Society, were held in the World Building on June 10 and June 24. Both were fairly well attended. The new officers who were installed on June 10 by the retiring secretary-treasurer, John E. Sterling, asked all members to give them their hearty co-operation for a successful year. Refreshments were served after the installation and a rising vote of thanks was tendered to Mr. Sterling for his able services rendered to the society in past years.

At the meeting on June 24, E. Schor had Wm. Voss answer a question in regard to two dynamos he had in his place of employment. Mr. Voss was congratulated on his answers and illustration which he gave. He certainly showed that he knows electricity.

EXPOSITION OF CHEMICAL INDUSTRIES

HEADQUARTERS, GRAND CENTRAL PALACE, NEW YORK

Developments in the fields of chemistry and chemical engineering have been so rapid since the 10th Exposition of Chemical Industries that the interest aroused is shown to a marked degree by the entire industry and the industrial world in the coming 11th Exposition of Chemical Industries.

Particular interest has been shown toward the sections of the Exposition that will be devoted to synthetic products, lacquers and the machinery and container sections. These sections already have listed a number of exhibits that will appear for the first time, either in domestic or foreign markets, and the interest manifested points plainly to the value of such products and developments.

One of the most interesting features of the forthcoming Exposition will be the exhibits of lacquers and pyroxylin (nitrocellulose) products. Remarkable results have been achieved by the manufacturers of these products through constant research and experimentation.

BRITISH INSTITUTE OF METALS

HEADQUARTERS, 36 VICTORIA STREET, WESTMINSTER, LONDON, S. W. 1, ENGLAND

The annual autumn meeting, which, as previously announced, is to be held at Derby, from September 6-9, under the direction of Sir Henry Fowler, vice-president, and with the assistance of G. W. Woolliscroft, who will act as honorary local secretary of the meeting.

A provisional program has been arranged. Further details will be issued later.

The autumn lecture and the meetings for the reading and discussion of papers will be held in the Technical College.

ENGINEERING MATERIALS CONFERENCE

HEADQUARTERS, WERKSTOFFTAGUNG, BERLIN, N. W. 7, INGENIEURHAUS, FRIEDRICH-EBERTSTR. 27.

A conference on engineering materials will be held in Berlin, Germany, at the New Exhibition Hall, Kaiserdam, from October 22 to November 13, 1927. This conference will include papers on all sorts of materials, including metals, exhibits and demonstrations of tests. Some of the papers will be on the following topics:

Heat-resisting Alloys; Rust-proofing by Surface Treatment; Acid-proof Alloys; Tools and Machine Tools for Machining Light Metals; Copper and Its Alloys; Aluminum and Its Alloys; Soldering Aluminum; Refinable Aluminum Alloys; Aluminum Alloys for Castings; Methods of Testing Bearing Metals; Internal Stresses and Their Removal; Nickel and Its Alloys; Melting and Casting of Metals; Die-Pressing; Non-ferrous Sheet Metal for Springs; Corrosion of Aluminum and Its Alloys; Metallic Engineering Materials in the Chemical Industry, etc.

The non-ferrous metals will be dealt with by material exhibits and by demonstrations of tests. The following groups of materials will be represented:

Copper and Copper Alloys; Aluminum and Aluminum Alloys; Magnesium and Magnesium Alloys; Lead; Tin; Zinc; Nickel; Silver; Gold; Platinum; Tantalum; Admixture Metals, such as Arsenic, Antimony, Cadmium, Cobalt, Manganese, Chromium; Alkaline Metals; Silicon; Phosphorus; Boron, etc.

Personals

G. W. THOMPSON

Gustave Whyte Thompson, chief chemist of the National Lead Company, delivered the graduation address at the Armour Institute commencement exercises in Chicago on Thursday, June 9, and received the honorary degree of D. Sc. (Doctor of Science).

GUSTAVE W. THOMPSON

Dr. Thompson was born in 1865 and has been chief chemist and a director of the National Lead Company since 1892. He is also a director and vice-president of the Wm. Harvey Company, a director of the Wm. Harvey Company, Limited, a director of the Titanium Pigment Company, director and vice-president United Lead Company, director and treasurer Metallurgical & Chemical Corporation, Fellow of the American Association for the Advancement of Science, the American Chemical Society, the Society of Chemical Industry, American Society for Testing Materials, Chemists' Club of New York, Metal and Rubber Club and past president of the American Society of Chemical Engineers.

ROBERT T. KENT

As noted in THE METAL INDUSTRY for June, President Carl F. Dietz of the Bridgeport Brass Company recently announced the appointment of Robert Thurston Kent as general manager of the company. Mr. Kent, who has a national reputation as an industrial and technical expert, is now in Bridgeport and has assumed his new duties.

ROBERT T. KENT

Engineers and technical men will be interested to know that the new general manager of the Bridgeport Brass Company is a son of the original author of "Kent's Mechanical Engineers Handbook," and is himself the editor and reviser of the tenth edition of that famous work which is referred to as "the engineer's Bible."

Mr. Kent has had a distinguished career in industrial work, including direct association in the pioneer work of Frank B. Gilbreth and Frederick W. Taylor, the fathers of modern industrial management and time study systems. Mr. Kent's practical experience began when, as a youth, he was an apprentice in a locomotive machine shop. He studied at Stevens Institute from which he was graduated in 1902 and then went back into industrial work, with interludes devoted to editing of technical publications and study of management methods.

From 1909-1912 Mr. Kent edited "Industrial Engineering," and afterwards was associated with Gilbreth and Taylor in their time study work, and in doing private consultant work. In 1917 he took the superintendency of a machine shop manufacturing hydraulic equipment for the U. S. Army and Navy. After this, Mr. Kent headed a firm of industrial consultants, supervising many big industrial engineering jobs. He resigned in 1921 to rewrite and edit the 10th edition of the famous handbook bearing his father's name.

In August 1924 Mr. Kent became superintendent of Prison Industries of the State of New York, a position which he held until March of this year. In this connection he completely reorganized the seventeen industries in the four prisons of the state, employing in one aggregate about three thousand men. His experiences in that field would fill a book. Mr. Kent is a member of the American Society of Mechanical Engineers and various other technical bodies, and has served as chairman both of American and International committees on mechanical standards and management problems.

Burton G. Daw for many years representative of the Hanson and Van Winkle Company in their western territory has joined the sales force of Lasalco, Inc., St. Louis, Mo. His many friends will wish him success in his new work.

BURTON G. DAW

W. L. Dethloff has resigned as general manager of the American Mond Nickel Company, Clearfield, Pa., and is succeeded by **H. R. Condon.**

J. F. Nonamaker, was married Tuesday, June 7th, to Miss Margaret Maas, and they are now residing at Woodhaven, Long Island. Mr. Nonamaker has been engaged in the lacquer business for twenty years, particularly in the metal working field. He has spent the major portion of this time with the Zapon Company.

W. K. Frank, vice-president of the Damascus Bronze Company, Pittsburgh, Pa, has been appointed vice-president in charge of the Pittsburgh district of the National Bearing Metals Corporation, New York. This corporation is a consolidation of several companies of which the Damascus Bronze Company is one.

J. W. Marshall has been appointed advertising manager of the Quigley Furnace Specialties Company, 26 Cortlandt Street, New York, manufacturer of Hytempite, a plastic refractory cement for bonding firebrick and kindred uses. Mr. Marshall comes to the Quigley organization from the Westinghouse Electric and Manufacturing Company, where he was manager of the Publicity Division of their Pittsburgh office. He has been connected in the past with the American Nickel Corporation where he served as assistant sales manager, and G. P. Blackiston and Staff. He is a member of the American Society of Mechanical Engineers and a graduate of Cornell University. His headquarters will be at the company's New York office.

George J. Hagan is now connected with the Surface Combustion Company and is located in their Pittsburgh office, where he will be engaged in furthering the sale of Surface Combustion billet heating furnaces and Surface Combustion equipment. Mr. Hagan has been in the furnace business in Pittsburgh for twenty-six years, having founded the George J. Hagan Company, furnace contractors and builders, the Hagan Corporation, manufacturers of Hagan control equipment and the Hagan Foundry Corporation. About two years ago Mr. Hagan sold his entire interest in these concerns and has been engaged in consulting work in the furnace and combustion field.

Obituaries

RICHARD YALE LOMBARD

Richard Yale Lombard died on June 15th at his home on Sentinel Hill, Ansonia, Conn., at the age of 41. He was general foreman of the American Brass Company, at their Ansonia mills. Ill only about three weeks when he was forced to give up his work and relinquish his duties. Mr. Lombard's death came as a complete surprise to his many friends in the surrounding cities.

Mr. Lombard was born in Springfield, Mass., the son of the late William J. and Alice Houghton Lombard and had lived in this section about 18 years.

He entered the employ of The American Brass Company on February 14, 1910. Before this, he was with the American Bridge Company, and worked as timekeeper of construction gangs. His first occupation with The American Brass Company was as bookkeeper. He was later advanced to time study work (data for installation of piece work system). Proving himself very capable in this line, he was advanced to production schedule foreman of the Fine Wire Department, after which he was promoted to general foreman of the Fine Wire Department; and in 1925 he was made general foreman of the combined Wire Mills of the Ansonia Branch of The American Brass Company.

His outstanding traits as a mill foreman were his ability to systematize proper flow of production work, and his success as an organizer of the personnel.

He is survived by his wife and a son, Richard Yale, Jr., two years old, and a brother, Raymond H. Lombard of Panama. He was a member of Derby Lodge of Elks, Court John B. Gardner, A. O. F., of Ansonia, and an honorary member of the Fountain Hose Company of Ansonia.

A. L. D. BUXTON

A. L. D. Buxton, president of Perry Buxton Doane Company, Boston, Mass., waste metal dealers, died on May 30 at his home in Worcester, Mass., at the age of 75. He was, as is generally known, an outstanding figure in the scrap industry, although for the last few years, he had refrained from active participation in the affairs of the company. Mr. Buxton had been in the business for some fifty years or more, having associated when a young man, with his father, the late Edward Buxton, who established himself in the scrap business in Worcester, Mass., in 1850. In 1901 he incorporated his business under the name of E. Buxton and Sons Company, and in 1911 his company was merged with the Wm. H. Perry Company of Providence, R. I., and George B. Doane and Son Company of Boston, under the name of The Perry Buxton Doane Company. He took the position of vice-president at that time. In 1917, upon the death of the president, Wm. H. Perry, he assumed the office of president and remained in this capacity until his death.

HENRY E. RUSSELL

Henry E. Russell, 88, retired New Britain manufacturer, who rose from office boy to President of the Russell & Erwin Manufacturing Company, New Britain, died June 3rd at his home, 1001 Ocean Avenue, New London, Conn. Mr. Russell underwent a serious operation last February.

Mr. Russell retired as President of the New Britain firm twenty-three years ago. He was born in New York Nov. 23, 1838, and was a son of the late William C. and Rachel Haven Russell. He was a young man when he was appointed Russell & Erwin Company's representative in the New York office, and later in the London and Paris offices.

He is survived by his second wife, a son, Isaac D. Russell, Treasurer of the American Hardware Company of New Britain; two daughters, Mrs. A. W. Stanley and Mrs. Ira Hicks of New Britain, and six grandchildren.

BENJAMIN ATHERTON HAWLEY

Benjamin Atherton Hawley, vice-president of the American Hardware Corporation, and general manager of the Russell & Erwin Manufacturing Company died on May 11 at his home in New Britain, Conn. Mr. Hawley was 59 years old.

JOSEPH SCHILLING

Joseph Schilling, former superintendent of the Russell and Erwin Division of the American Hardware Corporation, died at his home, 71 Grove Hill, New Britain, Conn., May 27, 1927. Mr. Schilling was born in Besinger, Germany, February 28, 1851, and emigrated to this country when a boy of 18. His service to the metal industry dates from 1869 when he entered the employ of The American Hardware Corporation to learn the brass molder's trade. By diligent application to his work he advanced to the position of superintendent of the Russell and Erwin Division from which position he retired thirteen years ago.

Mr. Schilling's life was devoted to the advancement of brass foundry practice and up to the time of his death he retained a keen interest in everything pertaining to this line of work. Surviving are his wife, Katherine S. Schilling, and three sons, Dr. Fredric J. Schilling of Toronto, Canada, Henry A. Schilling and Thomas A. Schilling of New Britain, Conn.

PATRICK H. BERGIN

Patrick H. Bergin, Detroit District Manager for A. P. Munning & Company, died in St. Marys Hospital, Detroit, on May 18th, as the result of injuries sustained when he was struck by a taxicab a week earlier.

Mr. Bergin was born at Waterbury, Connecticut, on March 10, 1873. He obtained his early business training in the brass shops in and around Waterbury and later moved to Pittsburgh where he was employed for several years by the Pittsburgh Lamp, Brass & Glass Company as foreman of polishing. It was while engaged in this work that Mr. Bergin conceived the idea of the Triplex buff which he later patented. He joined the sales force of A. P. Munning & Company in 1911 and remained with them until the time of his death.

Among the societies of which Mr. Bergin was a member, are the American Electroplaters Society and the Elks.

He is survived by a wife, Catherine, and a son, Thomas.

MICHAEL SEEBOTH

Michael Seeboth, age 75, secretary treasurer of the Seeboth Brothers Company, and the Milwaukee Bronze Casting Company died last month after a long illness. He came to Milwaukee more than half a century ago and engaged in bronze casting work. He is survived by his wife, Josephine, three sons, Adam, Henry and Albert, and five daughters, Katherine, Corinne, Sister Leona, Mrs. C. Cassell and Mrs. Herbert Wehling.

GENERAL GUY E. TRIPP

General Guy E. Tripp, chairman of the board of directors of the Westinghouse Electric and Manufacturing Company, died on June 14, in the New York Hospital, New York. General Tripp was one of the leaders in American industry and had a distinguished business career. He was at various times connected in important capacities with the Thompson-Houston Electric Company, Lynn, Mass., Stone and Webster, Boston and the Metropolitan Street Railway Company, New York. He served as chief of the Production Division of the Ordnance Department during the war and was awarded the distinguished service medal for his service. General Tripp was a director in many companies, having carried on a number of business activities.

JOHN T. PRATT

John T. Pratt, chairman of the board of the Chromium Corporation of America, New York, died on June 17, at the age of 54.

He was one of America's prominent industrialists, and one of the first to grasp the commercial possibilities of chromium plating.

NEWS OF THE INDUSTRY

Industrial and Financial Events

ANACONDA BUYS DETROIT MILL

The sale of the Detroit Copper and Brass Rolling Mills, Detroit, Mich., to the Anaconda Copper Mining Company was announced June 28th by Robert E. Dwyer, Vice President of the Anaconda Company, following a meeting of the Stockholders. The amount involved was said to exceed $12,000,000.

The plant will be operated and the business conducted by the American Brass Company, a subsidiary of the Anaconda.

The plant is one of the largest rolling mills in the United States, covering twenty acres of land and consuming in its mills more than 100,000,000 pounds of copper annually.

MACHINERY MERGER

The Consolidated Concrete Machinery Corporation, capitalized at $1,000,000, has been formed with headquarters in Adrian, Mich., to conduct the business formerly operated by the Anchor Concrete Machinery Company, Adrian; Thomas W. Noble and Company, Chicago, Ill.; Universal Tamping Machinery Company, Peoria; Adrian Casting Company, Adrian, and the Ideal Concrete Machinery Company, Cincinnati, Ohio. The last named company manufactures a line of standard and special metal cleaning, washing, drying and burnishing equipment.

LASALCO BUYS HEIL METER

Lasalco, Inc., St. Louis, Mo., have leased all rights to the manufacture and distribution of the Heil Foot Ampere Meter from the Coleman Lang Company, of Wichita, Kans.

SERV-EL SELLS WHEELER CONDENSER

The Serv-el Corporation, manufacturers of electrical refrigerators, has sold for cash its holdings of common stock of the Wheeler Condenser & Engineering Company but as additional consideration has retained for two years the plant of the Wheeler company at Newburgh, N. Y.

FIFTY YEARS IN BUSINESS

This year marks the fiftieth anniversary of the organization of the Kennedy Valve Manufacturing Company, Elmira, N. Y. The business was founded in 1877 by Daniel Kennedy, who is still president and in active charge of the organization. This unusually long and uninterrupted continuity of ownership and management has been an important factor in the steady development of the Kennedy business to its present proportions.

After successively outgrowing the four-story building in New York City in which it was started, and a much larger plant in Coxsackie, N. Y., the company moved in 1907 to Elmira, N. Y., where it now occupies two large plants, covering a total of thirty-five acres. The development of the company from the beginning has been closely identified with engineering progress in the various fields it has served. It was one of the first to recognize the advantages of gate valve design.

PAXSON-TAGGART OPERATIONS

There have been current a great many rumors among the trade regarding the status of Paxson-Taggart, Inc., Philadelphia, Pa., and the extent to which we were involved in the failure of J. W. Paxson Company, whose business is in the process of liquidation through a Committee of Creditors. The former company's affairs are not involved at all, and they are and have always been an entirely separate corporate entity.

However, because of the comparatively recent formation of Paxson-Taggart, Inc., and because of the simliarity in the names, together with the same address, it was quite natural that a good portion of the trade did not properly differentiate between the two companies in spite of previous announcements.

Paxson-Taggart, Inc., represents a merger of the sand, supply and facing business of the J. W. Paxson Company and M. R. Taggart & Co., and since August 1, 1926, the J. W. Paxson Company has been in the foundry equipment business only. It is this foundry equipment business only which is now being liquidated. Paxson-Taggart, Inc., is in no way involved or concerned in the failure of the J. W. Paxson Company, and will continue to conduct their business in foundry sands, supplies and facings as usual.

METALS COATING COMPANY

At the annual meeting of the stockholders of the Metals Coating Company of America held at the office of the Company, 495-497 North Third Street, Philadelphia, on May 10th, a Board of Directors was elected to serve for the ensuing year. E. Heinzerling, a newly elected member, is Director of the great Siemens-Schuckert Works, Ltd., in Hamburg, Germany.

At the organization meeting of the Board of Directors held on the same day, the following officers were re-elected for the ensuing year: Richard L. Binder, President; Rudolf H. Schroeder, Vice President; George Ruck, Vice President; E. Waring Wilson, Treasurer; J. C. Merkel, Secretary.

Vice President Schroeder is also European representative of the Company, with headquarters in Hamburg, Germany. He reported that the metal-coating business in Europe is in excellent shape and that the outlook there for the ensuing year is for greatly increased sales of the product, MetaLayeR. As is well known, MetaLayeR is an apparatus and process for spraying molten metal on practically any kind of a surface, regardless of the character, size or location of the material.

President Binder also reported that arrangements had been concluded for operating a branch plant in Prague, Czecho-Slovakia, in addition to the present plants in Philadelphia, Berlin and Hamburg, and for distribution rights for metal-coating equipment in the British Empire in conjunction with the present English Company. At the Board meeting held on May 10th, an initial dividend on the preferred stock at the rate of eight percent (8%) per annum was declared out of the net earnings, payable to stockholders of record as of March 31st, 1927.

FILM DEPICTS FABRICATION OF COPPER

The many intricate processes by which refined copper is fabricated into sheets, rods, wire, cables, etc., are depicted vividly in an educational motion-picture film just completed by the United States Bureau of Mines, Department of Commerce, in cooperation with one of the larger copper-refining concerns. The scenes were photographed in an eastern refining and rolling mill, where a considerable percentage of the world's copper is refined. The film supplements the 8-reel feature "The Story of Copper," recently released by the Bureau of Mines.

The rolling of sheet and strip copper is first picturized. The processes by which cakes of electrolytic copper are heated to red-hot temperatures and then subjected to continuous rolling until converted into slabs, are shown. The shearing of these slabs into pieces and the methods employed in hot-rolling them to thin sheets are depicted. Other scenes show the annealing of these copper sheets, their pickling in hot dilute sulphuric acid, and the processes by which they are washed and dried. In a particularly interesting view, an expert workman demonstrates the tin-plating of the copper sheets by the application of a coat of pure molten tin by hand.

Other scenes show how the copper sheets, seemingly already perfectly smooth and level, are further leveled by stretching in highly ingenious machines, after which they are trimmed to the desired size in other specially-designed machines and polished by buffing.

The methods by which bars of refined copper are rolled into rods and then drawn into wire of various sizes are visualized. One scene shows skilled workers grabbing red-hot copper rods as they emerge from the rolls at a speed of more than 1,000 feet per minute and looping the wire into other rolling machines which reduce it to still smaller diameter. Processes by which the rods are finally drawn cold through a series of dies which elongate them into wire of various gauges are depicted. The making of very fine wire from the coarser wire by drawing through diamond dies is shown. Another series of interesting views illustrates the manufacture of copper cable, the single strands of wire being fed into one side of the machine and emerging from the other side as a completely wound cable. The determination of the tensile strength of copper cable by the use of wonderfully accurate instruments is depicted.

This film, "The Story of the Fabrication of Copper" is available for exhibition by schools, churches, clubs, civic bodies and other organizations without charge, the exhibitor being asked, however, to defray transportation charges. Copies of the film may be borrowed from the United States Bureau of Mines Experiment Station, Pittsburgh, Pa.

BUYING ADVERTISING

O. C. Harn, Managing Director of the Audit Bureau of Circulations, of which THE METAL INDUSTRY is a member, in an address before the National Industrial Advertisers' Association, Cleveland, June 13, 1927, made the following remarks:

"There are two good reasons for insisting on Audit Bureau of Circulations reports. First, you owe it to yourselves to know what you are buying. To select a paper which does not give an audited statement because you have an impression it is all right, is certainly buying on a hunch. Secondly, it is only fair and just that publishers who have acceded to the demands of advertisers for audited statements should be favored. It isn't sporting to ask publishers to do something you want them to do and then turn your backs on those who comply and place your business with the one who tells you to go chase yourself. When I was an advertiser, I absolutely refused even to listen to a paper's selling talk until after it had furnished an A. B. C. report. A little firmness of this kind on the part of every advertiser would soon produce A. B. C. reports from every worth-while paper."

OCEAN FLYERS IN METAL BUSINESS

Charles A. Levine, who accompanied Clarence D. Chamberlin in his trans-Atlantic flight in a Bellanca monoplane, was formerly in the metal business with his father, Isaac Levine, in Greenpoint, L. I. In 1915 he went into business for himself, and in 1921 he organized the Columbia Salvage Corporation, buying up shell casings and ammunition from the War Department.

Clarence D. Chamberlin worked for a while with his father, E. C. Chamberlin, of Denison, Ohio, as a jeweler, but left to go into commercial aviation.

METALS SAFETY CAMPAIGN

The campaign which The Merchants' Association has inaugurated to reduce industrial accidents has been begun with the metals industry in the city of New York. A program has been outlined and its execution is in charge of a committee, consisting of Louis Doelling, vice-president of the De La Vergne Machine Company; J. B. Kirkpatrick, secretary of the Neptune Meter Company; G. A. Henckel, president of G. A. Henckel & Co.; Edgar Pfarre, treasurer of George Tiemann & Co.; H. B. Nickerson, vice-president of the American Schaeffer & Budenberg Corporation, representing the industry.

There are more than 100,000 workers in the metals manufacturing industry in the New York City district.

CADMIUM IN 1926

The production of metallic cadmium in the United States in 1926 amounted to 810,428 pounds, valued at $429,527, based on the average selling value of 53 cents a pound, as reported by producers to the United States Bureau of Mines, Department of Commerce. These figures represent an increase of 61 per cent in quantity and 55 per cent in total value, as compared with 1925. The market quotation on American metal, New York, remained at 60 cents a pound throughout the year. No cadmium was imported into the United States in 1926.

METALS IN AUTOMOBILES

According to estimates of the American Bureau of Metal Statistics, the consumption of metals in automobiles in 1926 was as follows:

Copper	102,800	tons
Zinc	21,300	tons
Tin	16,000	tons
Lead	16,700	tons
Aluminum	24,300	tons

In addition the lead used in storage batteries amounted to 104,500 tons.

MERCURY IN 1926

The mercury production of the United States in 1926 amounted to 7,645 flasks of 75 pounds each, according to the preliminary figures compiled by the United States Bureau of Mines, Department of Commerce. The imports were 28,614 flasks, and the average New York price for the year was $91.90. In 1925 the domestic output was 9,174 flasks; the imports were 22,781 flasks, and the average New York price was $83.13. The total value of the 1926 domestic production based upon the average New York price for the year was $702, 598.

SIMPLICATION OF FLASH-LIGHT CASES

A simplified practice recommendation, covering sizes and finishes of flash-light cases, was adopted by a general conference of manufacturers, distributors, and users of this commodity held under the joint auspices of the National Committee on Metals Utilization and the Division of Simplified Practice on Wednesday, April 27, 1927, resulting in an elimination of approximately 40% of varieties.

A standing committee is to be appointed by the National Committee on Metals Utilization. The function of this Committee will be to revise or modify the recommendation periodically as conditions dictate.

PYROXYLIN SOLUTIONS AND PLASTICS

According to the Bureau of the Census the total value of pyroxylin solutions not made in paint or varnish factories, pyroxylin plastics other than rayon, and other plastics, produced in 1925 for sale, aggregated $48,731,957 in value, an increase of 12.9 per cent as compared with the last preceding census year. This is made up as follows: pyroxylin solutions reported by weight, 35,302,300 pounds; pyroxylin solutions reported in volume, 2,444,304 gallons, total value $14,156,889. Pyroxylin plastics (other than rayon) 13,703,153 pounds, valued at $13,720,802. Finished articles of pyroxylin made in the establishments producing the plastic, $10,984,254.

PLATINUM IN 1926

The platinum refiners of the United States in 1926 purchased 171 ounces of crude placer platinum of domestic origin and 43,096 ounces of foreign crude platinum, according to J. M. Hill, of the United States Bureau of Mines, Department of Commerce. In 1925, the refiners purchased 251 ounces of domestic crude platinum and 47,297 ounces of foreign crude platinum. Domestic material purchased in 1926 included one ounce from Alaska, 110 ounces from California, and 60 ounces from Oregon. Purchases of foreign crude platinum in 1926 were: Australia 4,242 ounces, Canada 23 ounces, Colombia 37,564 ounces, and Russia 1,267 ounces.

Refined platinum metals recovered in 1926 from crude platinum, from ore and concentrates, and from gold and copper refining amounted to 84,981 ounces of which 11,165 ounces is believed to have come from domestic materials.

Business Reports of the Metal Industry Correspondents

NEW ENGLAND STATES

WATERBURY, CONN.

JULY 1, 1927.

Waterbury in 1925 led the other cities of the state in cost of materials used in manufacture according to the United States Department of Commerce, stood second in the payment of wages to employes, second in the number of wage earners and second in the value of manufactured products. Cost of materials amounted to over 68 million dollars, value of products, over 127 million, wages over 30 million, and average number of wage earners, 23,626.

The Watertown avenue plant of the **Connecticut Brass & Manufacturing Company** was auctioned off by order of the United States district court last month. The highest bid was $80,000, made by **Schnee & Schnee**, of New Haven, who will take possession of the plant if the sale is approved by Judge Edwin Thomas of the court. The plant includes a rolling mill and manufacturing building together with considerable equipment and three acres of land. Previously about $100,000 worth of machinery was sold at private sale. The other plant of the company, in Cheshire, consisting of a casting shop and rolling mill was sold some time ago at private sale to **Louis N. Leopold** of this city for a price not made public. This concern was established as a $3,000,000 corporation during the war but has been in receiver's hands for some years.

Brass used in the radiators of **Col. Lindbergh's** plane was made by the **Chase Companies, Inc.** it is announced by the local concern. The same was true of the brass in the radiators of Lieut. Byrd's plane which crossed the North Pole and some of the planes of the round-the-world flyers.

Frederick S. Chase, president of the Chase Companies, has returned to this city after a three months' trip to the Philippines and China. In the latter country he visited his son, A. S. Chase, who is vice consul at Peking.

Although considerable machinery has been transferred from the old plant of the former **New England Watch Company** to the main plant of the Waterbury Clock Co., **Irving H. Chase**, president and treasurer of the latter concern, states that the former plant is not to be closed. The New England Watch Company was originally the **Waterbury Watch Company.** After becoming the New England Watch Company it was purchased by the **Ingersoll Company.**. A few years ago the Waterbury Clock Company bought the assets of the Ingersoll Company.

The **Manufacturers Foundry Company** has won the $12,000 suit brought against it by the **Newark Motor Products Company.** Judge A. C. Baldwin of the Superior court decided in favor of the local company. The Newark concern claimed castings sent it by the local company were defective while the latter claimed they were according to the specifications.

The Federal Trade Commission has issued a complaint against the **Waterbury Clock Company**, claiming unfair competition through alleged price fixing for the sale of its watches. A hearing has been set for July 11 at Washington. The complaint alleges that the local concern maintains a thorough investigation system whereby it seeks to learn of dealers selling its watches at other than the specified prices or of wholesalers who resell them to other wholesalers. It further charges that the local company uses this information to "induce and coerce" dealers who fail to maintain the specified prices and that it "threatens" such dealers by telling them that they will no longer sell them watches and that sometimes these threats are carried out.

F. S. Chase of the **Chase Companies** is a member of the joint committee representing the business and public interests of the six New England states which has just made a report on the proposed shipway from the Great Lakes to the Atlantic. The report unanimously recommends the building of such a shipway via the St. Lawrence by the United States and Canada jointly and rejects the alternate proposal for the construction of a purely American route.

E. O. Goss, president of the **Scovill Manufacturing Company** has returned from attending the New England council annual conference at Rye Beach, N. H.

James R. Coe of this city, assignor to the American Brass Company has received a patent on an annealing furnace. **William H. Bassett, Jr.**, assignor to the same Company, has received a patent on wrought metal articles—W. R. B.

BRIDGEPORT, CONN.

JULY 1, 1927.

Bridgeport led all cities of the state in the value of manufactured products during 1925, according to the United States Department of Commerce, also led in the amount of wages paid employes and the number of employes and stood second in the cost of materials used in manufacture. New Haven and Hartford, although larger cities, stood much lower. Value of products amounted to over 148 million dollars, payment of wages to over 34 million, number of wage earners to 28,763 and cost of materials used to over 68 millions.

Settlement of the "brass conversion" price controversy between the **Remington Arms Union Metallic Cartridge Company** of this city and the United States government, a question in dispute since 1918, has been made by the Court of Claims in favor of the local concern. The government is ordered to pay $646,829 to the company, a sum withheld by the government in the belief it had been overcharged that much by the manufacturers. The local company contracted in 1914 with the American Brass Company for five years' supplies of material for the fabrication of cartridges. When it agreed in 1917 to furnish the government with war munitions, it required more brass from the American Brass Company than the latter was willing to allot it under the previous contract at the price given in that contract. Consequently, the Remington Company was obliged to pay more for most of the material used in filling the government orders and charged the government accordingly. The government, however, contended that the Remington company's charge to it should be based on the price in the contract with the American Brass Company.

The entire caster business of the **Foster Merriam Company** of Meriden has been purchased by the **Bassick Company** of this city, **H. O. King**, vice president and general manager of the latter states. The Bassick Company already has one plant in Meriden, to which the manufacturing business of the Merriam company will be transferred, allowing the latter company to concentrate on foundry products.

Directors of the **American Chain Company** last month declared the usual quarterly dividend of $1.75 a share on its preferred stock, payable July 1.

Robert Thurston Kent, recently appointed general manager of the **Bridgeport Brass Company**, was the principal speaker at the closing exercises of the Bridgeport Engineering Institute, June 4. **William R. Webster**, vice president of the **Bridgeport Brass Company**, and a director of the Institute, also spoke. The Institute was started in 1924 to give technical training in the evenings to young men employes of the local plants. It is supported by the Manufacturers' Association, Chamber of Commerce, Board of Education, the Engineers' Club and the local branch of the American Society of Mechanical Engineers.

Damages of $17,000 and an injunction restraining the transfer of shares in the **W. J. Collins Company, Inc.**, are sought in actions filed in the superior court by **John Cornel**, receiver for the company against William J. Collins, president and treasurer.—W. R. B.

CONNECTICUT NOTES

JULY 1, 1927.

TORRINGTON. The Torrington Company has purchased the business of the **Chicago Handlebar Company**, of Shelby, Ohio, and is moving the machinery to Torrington to be set up in the Standard plant. The company has been employing about 75 workers and about 10 of them will be brought here. Handlebars, seat posts and pedals for bicycles and velocipedes are among the articles manufactured. **Walter C. Thompson**, who

was vice president and manager, will come here to have charge of the new department.

Clarence **Little** of this city, who has been in the sales department of the **American Brass Company** for a number of years, has been promoted from the Philadelphia office to have charge of the territory surrounding Buffalo. He will be succeeded in the Philadelphia office by another Torrington man, **George M. Hurlburt.**

The gaskets used on **Col. Lindbergh's** plane were manufactured by the **Fitzgerald Manufacturing Company** of this city it has been announced. Lieut. Byrd's plane, which flew to the Pole, also carried them.

Announcement has been made that the $500,000 left to the Charlotte Hungerford Hospital by will of its founder, the late Uri T. Hungerford, has been placed at the disposal of the institution.

WINSTED. The **Adrola Corpooration,** of New York, according to **Norman F. Thompson,** president of the **Gilbert Clock** Company, of this city, will locate here and take over the **Carer and Hakes** building for its factory. Stock sufficient to bring the concern to Winsted is now being sold by the local Chamber of Commerce.

NEW BRITAIN. The **American Hardware Corporation** of this city leads in the amount of taxes assessed this year, according to tax bills just sent out. It will pay $301,498. The next highest amount will come from the **Stanley Works,** $218,070, and the third will be **Landers, Frary & Clark Company** with $170,566.

The **Stanley Works,** through Vice President **Philip B. Stanley,** has made a gift of land at Church and Elm streets to the city for the purpose of widening the street and sidewalk. It contains 195 square feet and will allow the cutting of 12 feet of the curb and sidewalks. The company specifies that the city is to bear the expense of erecting a catch basin and laying a cross walk.

BRISTOL. The **Horton Manufacturing Company** of this city is suing the **Union Hardware Company** of Torrington on the ground of infringement of its patents on golf clubs. The action is now being heard by Judge Edwin S. Thomas of the United States District court. The plaintiff asks an injunction and damages.

Erwin B. Case, employment manager of the **New Departure Manufacturing Company,** died June 6 at Hartford hospital. He was 59 years of age and had been with the company since 1889. He leaves his wife, two sons, one daughter and one brother.

PLANTSVILLE. The properties here and in Southington of the **Rowe Calk and Chain Company** have been ordered sold by Judge Edwin S. Thomas of the United States district court. **Samuel C. Morehouse,** receiver, made application in May for authority to make the sale, the proposed price being $106,000, the proposed purchaser being Ralph K. Safford of New Haven. A payment of $1,800 has been made and an option taken on the property.—W. R. B.

PROVIDENCE, R. I.

JULY 1, 1927.

The **Apco-Mossberg Corporation** is the name of a new concern that has resulted from a consolidation of the Apco Manufacturing Company of Providence and the Frank Mossberg Corporation of Attleboro, through purchase of the latter concern by the former. This will result in the removal of the Apco concern from Providence, to the Mossberg plant at Attleboro, according to Thomas F. Wilson, president and treasurer of the corporation. The combined assets of the two concerns is approximately $2,000,000.

The purchase of the Attleboro concern was effected through exchange of securities, and no new financing is contemplated, Mr. Wilson states. The plant of the Mossberg Corporation contains approximately 100,000 square feet of floor space and is equipped with modern machinery for the making of practically everything in the metal lines, including screw machine products, drop forgings, metal and composition stampings, heat treating, plating, welding and tool making. The new concern will thus be enabled to make all parts of the Apco products, which have been principally automobile products and accessories, many of which are now purchased outside. Several new products will be added to the Apco lines, Mr. Wilson states.

The Apco Company now maintains sales offices in New York city, Chicago, Montreal, Kansas City and Dallas in some of which places stocks are carried, and distribution of the Mossberg products will be made through these channels. Some sections of the Apco plant will be removed to Attleboro at once, with others to follow later, and the entire consolidation will be effected, it is expected, before the end of the year. The only part of the plant to remain in Providence will be its printing department, which will be housed in other quarters than now occupied. The company's buildings on Eddy street will be sold.

The Apco Manufacturing Company was founded in 1909 by Mr. Wilson and was first known as the Auto Parts Company. It does a large export business, particularly with South America. About 400 employes will work in the Attleboro plant Management of the combined plants will remain in the hands of Mr. Wilson, assisted by executives of both organizations.

The **American Chain Company,** to be located in Providence for the manufacture of jewelry and chains, with a capital of $25,000, has obtained a charter from the Secretary of State under the laws of Rhode Island. The incorporators are Frederick W. Bopp and Otto P. Kulisch, both of Providence, and Julius T. Flink of Plainville, Mass.

The **International Chromium Plating Company** is a new concern located in the Herrick building on Garnet street, Providence. The new company has installed an up-to-date plant for the carrying on of a general chromium plating business. Particular attention will be given to plating of jewelry and many other special productions with the new chromium finish. The new plant is in charge of J. A. Fogerty.

B. Novgrad & Company, manufacturing jewelers, 100 Stewart street, Providence, will be known in the future as **Novgrad & Rothman.**

Articles of incorporation have been filed at the office of the Secretary of State under the laws of Rhode Island by a manufacturing jewelry concern to be known as The **Metal Craftsmen, Inc.,** to do business in Providence and vicinity. The incorporators are: Chauncey E. Wheeler, Hayward T. Parsons and Roger T. Clapp, of Providence. The original capital stock was 500 shares of common, no-par value, but was changed to $50,000 and 1,250 shares of no-par common stock.—W. H. M.

MIDDLE ATLANTIC STATES

NEWARK, N. J.

JULY 1, 1927

Metal manufacturers are doing fairly well at the present time and are hopeful for a good summer season. The **American Dyes and Chemicals, Inc.,** was chartered with $1,000,000 capital preferred and 50,000 shares no par value. The company will manufacture chemicals and the incorporators are Edward A. Underriner, J. S. Leichliter and Edward L. Duggan. The **Essex Smelting and Refining Company,** will start with $50,000 preferred and 100 shares common no par. The company will refine metals.

Federal Judge Rellstab has entered an order confirming the sale of real estate of **David Grimes, Inc.,** defunct radio manufacturing concern, 151 Bay Street, Jersey City. Receivers informed the court that the highest bid of $201,500 for the property was made by the Whittier Corporation, New York. Receivers said readvertising might not bring a better bid.

The following concerns have been chartered here: Essex **Metal Ceiling Company,** manufacture metal ceilings. $50,000; **E. Lutz Company,** plumbing material, $10,000; **Joseph Cordasco Jewelry Company, Inc.,** manufacture jewelry, $100,000; **Splitdorf Radio Corporation,** radio supplies, 1,000 shares no par value; **Globe Specialty Company,** manufacture metal novelties, $25,000; **City Radio Company, Inc.,** radio equipment, $20,000.—C. A. L.

TRENTON, N. J.

JULY 1, 1927

Business remains quiet in the metal industry in this city and some of the manufacturers believe that it is going to be a quiet summer. Some of the manufacturers announce an increase in the prices of their products. The rise in prices has resulted in the jobbers finding a good demand for the stocks on hand.

The **Skillman Hardware Manufacturing Company,** the largest hardware concern in this section, is now operating but five days a week. William G. Wherry, president of the concern, says he believes that business will be quiet until late in the summer when he expects the trade to pick up considerably. Building has not been very brisk thus far this summer and this had a tendency to affect the hardware trade.

The **Trenton Brass and Machine Company** continues to operate five and a half days a week. The **Trenton Emblem Company** announces that business has not shown any increase over last month.

The **R. C. Roberts Company,** distributors for the Radio Corporation of America, has leased for ten years the Risdon Mills on North Broad Street. The Roberts company will expend $25,000 on improvements to the building.

Concerns chartered here were as follows: **Elizabeth Electro Plating Company,** Elizabeth, $50,000 capital; **S. Minkoy & Son, Inc.,** Passaic, metals, $25,000; **Imperial Jewel Company,** Camden, manufacture jewelry, $100,000 capital; **B. B. Laboratories, Inc.,** East Orange, manufacture radio supplies, 1,000 shares no par; **Coutts Electric Company,** electrical supplies, Perth Amboy, $100,000 capital; **Jabex Manufacturing Company,** Camden, manufacture chemicals, $125,000.

The **Radio Electric Clock Corporation,** newly formed, has purchased ninety building lots at Linden, N. J. as a factory site. The corporation has awarded major contracts for construction of a building to house 200 employes, the first unit of a plant in which 1,000 men and women will be employed. The product of the new concern will be a clock, which will be controlled as to accuracy in operation by radio, in keeping with the regular broadcast of time signals by the United States Naval Observatory. The officers of the Company comprise Colonel Frederick L. Deveraux, of Westchester County, New York, a vice president of the Bell Security Company, president; Colonel Frederick L. Burnham, of New York, secretary and treasurer; Oliver Lewis Badger, formerly of Plainfield, vice president and general manager. Mr. Badger is the inventor of the new clock.

The **Tung-Sol Lamp Company** has purchased the industrial property at High and Seventh Streets and will extend its plant.

Federal Judge Joseph L. Bodine in the United States District Court at Trenton, N. J., has handed down a decision awarding to the **American Can Company** and its subsidiaries a judgment restoring to the firm approximately $3,000,000 collected by the Internal Revenue Department in extra assessments on 1917 income. The judge held, in effect, that the Revenue Department was without jurisdiction and legal authority in readjusting the estimate on the Can Company's 1917 income and making additional assessments of $2,705,501 on the basis of the adjusted estimate.—C. A. L.

MIDDLE WESTERN STATES

TOLEDO, OHIO

JULY 1, 1927

Toledo factory employment is keeping up well notwithstanding the general slow-down of business in many parts of the United States. The Merchants' and Manufacturers' association in a recent report shows 29,916 men now are employed in the local plants.

The **Buckeye Welding Company,** 103 Indiana avenue, Toledo, his just completed an addition to its plant, 40 by 60 feet, which nearly doubles its working space and provides room for much new equipment. Radiator, body and other repair work has been added to the company's activities. It now does both acetylene and electrical welding. The company's plant formerly faced on Indiana avenue only. The addition carries it to Eleventh street and gives it an entrance there. The proprietors are Oscar E. and Lawrence E. Roberts.

The **Airways Corporation** at Toledo, Ohio, is having the greatest year in its history. Distribution, it is announced, has doubled over that of 1926. The plant is on Auburn avenue and from it flows an almost continuous stream of Airway systems which go to all sections of the country. Raw materials, including aluminum, copper and nickel, are arriving at the plant in car loads.

The **Mather Spring Company,** Toledo, operates one of the largest nickel plating plants in the United States. Upwards of 400 men are given employment in the combined departments. Owing to a heavy demand for its product, it is now rushed in order to keep up with orders. The officers are Gordon M. Mather, president; N. E. Hendrickson, vice president; Rathbun Fuller, secretary; W. H. Bunker, treasurer; George B. Secor, sales manager, and H. J. Langley, factory manager.

DETROIT, MICH.

JULY 1, 1927

The **Lake Shore Brass Works** have been incorporated at Holland, Mich., with a capital stock of $40,000. The stock holders are William E. Dunn and Arthur W. Wrieden, Holland, and John C. Quist, Grand Rapids.

D. M. Ireland, president of the **Michigan Copper & Brass Company,** Detroit, again declares there is no foundation to rumors of a contemplated merger of his organization with other copper and brass interests. He states emphatically his company is not negotiating with any interests for the disposal of its business.

The **Motor City Plating Company** has been incorporated in Detroit with a capital stock of $40,000. The owners are James C. Nankervis, Henry E. Adelsperger, Jr., and Glen F. Friedt, 2525 Glendale avenue, Detroit.

The **Bohn Aluminum & Brass Corporation,** Detroit, has increased its dividend rate from $1 to $1.50 annually, payable 37½ cents a share in January, April, July and October. The first payment at the new rate was on July 1 to stockholders of record of June 15.

The **General Brass Company** has been incorporated at Detroit with capital of 60,000 shares non-par value. The owners are William S. Chilman, Elwood C. Johnston and W. S. Killman, 100 South Campbell avenue, Detroit.

The **Bohn Aluminum & Brass Corporation** at Detroit, it is announced, is soon to start on the construction of a one-story addition that will extensively increase its floor space and facilities in general.

Samuel Stathos, general manager of the **Mutual Welding Company,** 4721 Russell street, Detroit, announces that new equipment has recently been installed in this plant in order to take care of the increasing volume of electric arc and oxy-acetylene welding work.

The new plant of the **Michigan Stove Company,** ground for which was recently broken at Brightmoor, in the Plymouth road district, Detroit, is making rapid progress. The site is in the same area as the new plant of the **Electric Refrigeration Corporation,** another major concern. Equipment for the new stove foundry is being manufactured by the **Osborn Manufacturing Company,** at Cleveland. Every labor saving device known to science of this industry is being provided for. The new plant, it is expected, will be in operation by November 1. About 1,200 men will be employed.

CHICAGO, ILL.

JULY 1, 1927

The metal industry during the past month in the Chicago district has been rather fair with many of the foundries reporting a fair volume of orders in hand. Building activities in this section of the country have stimulated the demand for

brass, copper, tin, nickel and bronze and every indication seems to point to a continued building demand.

One of the new firms to be incorporated recently in Chicago is that of the **American Bronze Foundry,** located at 4921 West Lake street. It is capitalized at $25,000. The firm announces that it will design and manufacture. The incorporators are Jules Berchem, Alfred Berchem, and Irene M. Lefkow. All are experienced in the metal industry having been connected with various metals firms in this territory.

MILWAUKEE, WIS.

JULY 1, 1927

The **Leyse Aluminum Company,** Kewaunee, Wis., is building a large addition to its factory, according to ojcials. The addition will be two stories and will be 56 x 97 feet. It will also be of brick construction.

A $11,000 warehouse is being constructed at Appleton, Wis., by the **I. H. Bahcall Metal Company.** It will be a one story building and measure 66 x 66 feet.

Announcement was made recently of the retirement of **Bruno Dallwig,** for seventeen years associated with the **Wisconsin Aluminum Foundry Company,** Manitowoc, Wis., Mr. Dallwig's interest being taken over by the company, of which Abraham Schwartz and David Balkansky are owners.

The **D. Miller Metal Company** has been incorporated at Green Bay, Wis., for $10,000. Incorporators are M. Miller, E. L. Everson and Lynn D. Jaseph.

OTHER COUNTRIES

BIRMINGHAM, ENGLAND

JUNE 20, 1927.

In the metal trades of Birmingham firms are moderately engaged, although very few carry reserves. In some cases a spurt was experienced just before the holiday, but the general trend showed that foreign inquiries have receded and many home consumers are postponing their orders in the present weakness of the copper market. Some of the manufacturers of brass and copper tubes will benefit by the orders which are to be given out in connection with the building of destroyers for the Chilean government. Some business with South America is being done, but foreign competition is particularly keen in sheets and rolled metal. Some of the brassfounders find a definite and consistent improvement since the beginning of this year, one firm having its mills fully engaged right up to the present day. Jewelers and silversmiths, however, find no relief from the depression under which the trade has long been suffering.

The annual report of the British Non-Ferrous Metals Research Association shows that last year this organization incurred an expenditure of £25,000, the highest amount yet achieved. The Chairman, Thomas Bolton, at the annual meeting, made a strong appeal for greater support from firms interested in the results. He commented on the disappointing response received so far from users of non-ferrous metals, and spoke also of the considerable margin of producers who take advantage of the work of the Association but fail to play the game in helping that work along Mr. Bolton took an optimistic view of the future of the Association's activity. He welcomed the inflow to the metal industry of young men with University training and he inclined to attribute the broader outlook in business today, the more genuine comradeship between buyer and seller, to the greater understanding of a new generation of adequately trained University men. Sir Alfred Mond endorsed this tribute to University influences and said that his own view was that the scientific idea must be carried through in every department—research, production and selling. That might involve a change in the whole tectnique of business and the change could be made effectually only if young men would require both laboratory investigation and understanding co-operation between the users of material and those who produced it. He instanced the success of the method as between chemical manufacturers and the metallurgical industry. By that means in his own experience it had been possible to secure certain alloys very badly needed in the chemical trade. As an indication of the limitless scope for metal research, Sir Alfred instanced nickel plating, an old enough process, he said, but one which is as yet little scientifically understood. There were prizes to be gained and the prizes in metal research work were great indeed, for in the matter of alloys all the research work yet done had only touched the fringe of the subject.—J. H.

Business Items—Verified

Cincinnati Electrical Tool Company, Cincinnati, Ohio, has removed its Philadelphia office to larger quarters at 716 No. 16th Street. H. M. Reynolds is district manager. This firm operates a tool room and a grinding room.

American Antique Brass Company, Inc., 54-58 E. 9th Street, New York, suffered a slight damage from water used in putting out a fire in their building. The plant is re-conditioned and is working with full force as heretofore.

The **Apollo Metal Works,** La Salle, Ill., have appointed as their sales agents in the middle west the Steel Sales Corporation, Chicago, Ill. This organization will sell the Apollo sheets, strips and circles of nickel, brass and copper-plated zinc.

The **Globe Sherardizing Company,** 1259-65 West 78th Street, Cleveland, Ohio, has changed its name to the **Globe Rustproofing Company.** The personnel of the company, location, as well as operations performed remain unchanged.

The **Homestead Valve Manufacturing Company, Inc.,** Homestead, Pa., announces the appointment of the Ziegler-White Company, 155 Second Street, San Francisco, Calif., as the exclusive representative of this company in San Francisco and the surrounding territory.

The **S. Obermayer Company,** Chicago, Ill., manufacturers of foundry equipment and supplies, announces the recent appointment of the Penhallegon Foundry Supply Company, Birmingham, Ala., as distributors of the Obermayer line in Birmingham and that territory in the South.

Handy and Harman, of 57 William Street, New York, refiners and dealers in precious metals, have awarded contracts for new buildings and extensions to their refinery and mills at Bridgeport, Conn. New rolling mills, annealing furnaces and other equipment will be installed as well as additional facilities in the refining department.

The **Federal Electric Company,** 8700 South State Street, Chicago, Ill., has announced the manufacture of a line of electric ranges. Six models are now being made, all of range frame materials, reinforced by angle iron. On two of the models the oven door frame, hinges and handles are of malleable iron, while nickel plating is used on these parts on the other models.

Alois Aufrichtig Copper and Sheet Iron Manufacturing Company, 900 South Third Street, St. Louis, Mo., has acquired a site and plans the construction of a factory at Delor Street and Missouri Pacific R. R. The company will build within the next six months, for the manufacture of tanks, stacks and kindred lines of sheet and plate steel; also general line of copper work. Estimated cost $75,000. This firm operates a tinning department.

The **Harry Schneider Company,** 1225 Broadway, New York, has been appointed exclusive sales agent in the United States and other export countries by the Compagnie Generale de L'Industrie, Brussels, Belgium, a combination of 24 manufacturers in Belgium. Included are iron and steel products, such as cast iron pipe and fittings, steel rails, building materials, window and plate glass, lead sheets, aluminum sheets, lead

pipes and other non-ferrous metals, paints and lighting fixtures.

The **Lincoln Electric Company** announces the following changes and additions to their Sales and Service Department. L. P. Henderson formerly connected with the Detroit Office, has been transferred to Chicago in charge of Welder Service. J. E. Durstine has been transferred from the Experimental Engineering Department to Welder Service Department at Cleveland. J. W. Shugars of the Time Study Department at Cleveland, and R. D. Layman, also of Cleveland, have been moved to Detroit under the direction of J. M. Robinson. D. H. Carver has been transferred from the Machine Shop Division at Cleveland to the Ohio Service Division with headquarters at Cincinnati. R. F. Terrill has been transferred from General Engineering Department at Cleveland to the Eastern Service Division with headquarters at New York.

INCORPORATIONS

Health Aluminium Company, Detroit, Mich, have been incorporated for $2,500.

Zidac Products, brass founders, Hempstead, L. I., have been incorporated for $20,000.

Bradson, Inc., brass goods, Newark, N. J., have been incorporated for $100,000.

Hodson Brass Works, Brooklyn, N. Y., have been incorporated for $300,000.

Akron Brass Manufacturing Company, New York, have been incorporated for $20,000.

The **Kulka Iron and Metal Company,** Alliance, Ohio, has been organized to deal in structural shapes and plates and scrap iron and metal.

Western Brass Inc., has been incorporated with capital of $40,000. The present address is care of H. A. Pearse, 510 Lloyd Bldg., Seattle, Washington. This firm will operate the following departments: brass foundry, machine shop, tool room, plating room, lacquering room, grinding room.

The **Air Valve Ignition Company,** Loveland, Colo., has been organized to manufacture air valve spark plugs. Equipment has been bought and the company expects to have the factory in operation within 90 days. This firm will operate the following departments: brass machine shop, tool room, lacquering.

Sinnock-Bachofner, Inc., 3 Orchard Street, Newark, N. J., has been organized to deal in and refine precious metals and their alloys. A plant is equipped for the treatment of sweeps, polishings, filings, scrap consisting of or containing precious metals. This firm operates a smelting and refining department.

Peerless Valve Manufacturing Company, 1302 N. Halstead Street, Chicago, Ill., has been incorporated with $40,000 capital to manufacture valves, plumbing fixtures, pipe and metal goods, by F. O. Fitzpatrick, A. H. Witt and Edwin J. Nunn, 105 West Monroe Street. This firm will operate a brass machine shop.

The **American Alloy Tool Company,** 240 East Wishart Street, Philadelphia, Pa., has been incorporated to manufacture alloy cutting tools and to carry on the smelting and refining of alloys. Equipment has been purchased and the company expects to get into production at once. This firm will operate the following departments: smelting and refining; casting shop, cutting-up shop, polishing, grinding room.

The **Pulverized Fuel Equipment Company** has been organized in Chicago, Ill., with Aubrey J. Grindle as president. This company will manufacture and sell pulverized coal burning equipment for metal melting and treating processes. The company plans to do considerable work in connection with brass, copper and aluminum melting in addition to its other activities such as steel manufacture and power plants.

The **Titgen-Eastwood Company** has procured all of the patterns and drawings of J. W. Paxson Company, Philadelphia, Pa., covering the complete line of Paxson foundry equipment. The personnel of this company consists of four men who have spent a great many years in the equipment field with J. W. Paxson Company, and who are thoroughly familiar with the minute details of all of the items of foundry equipment. The Titgen-Eastwood Company will manufacture the general line of foundry equipment heretofore made by the J. W. Paxson Company, and can also furnish immediately repair parts for all equipment heretofore sold by J. W. Paxson Company. Offices and plant will be located at Luzerne and D Streets, Philadelphia, Pa.

The Club Aluminium Utensil Company, Chicago, has been incorporated in Illinois to take over the business of the Club Aluminium Development Company. The new corporation will have an authorized capital stock of 300,000 no par shares, of which 240,000 will be distributed to stockholders of the old company on the basis of four new shares for one share of the present company. The old company was one of the country's leading manufacturers and distributers of kitchen utensils, and the formation of a new company is being effected to provide for still further growth.

FINANCIAL ITEMS

The **Sangamo Electric Company** of Springfield, Ill., has issued 42,000 shares of no par common stock at $28.50 per share. This stock will pay a dividend of $2.00 per year.

The **Driver-Harris Company** of Harrison, N. J., has issued $1,300,000 in first mortgage sinking fund 15-year 6% gold bonds. The proceeds of these bonds will be used to purchase or retire the present first mortgage 8% bonds of the company, to provide additional working capital and for corporate purposes.

National Bearing Metals Corporation of New York has issued $1,000,000 in first mortgage 20-year 6% sinking fund gold bonds. The proceeds from the sale of these bonds have been used in connection with the acquisition of the business and properties of the More-Jones Brass and Metal Company of St. Louis, Mo., the Bronze Metal Company of New York and the Keystone Bronze Company of Pittsburgh.

BUSINESS TROUBLES

The Brightwood Bronze Foundry Company, Springfield, Mass., is in bankruptcy and the trustee has filed his final report and account. A meeting of the creditors was held in Springfield, June 24.

The Peerless Light Company, Chicago, Ill., has filed a petition in bankruptcy and Fred E. Hummel, Chicago, has been appointed receiver. Immediate investigation of this company will be made and information transmitted to the creditors.

The property of the **Interstate Brass and Copper Company,** Chicago, Ill., was sold at auction on June 28. In addition to the real estate, good will and miscellaneous items, the following metal products were sold: 100,000 lbs. sheet copper; 100,000 lbs. sheet brass; 165,000 lbs. brass rods; 60,000 lbs. copper bus bars; 75,000 lbs. brass tubing; 35,000 lbs. copper tubing; 10,000 feet copper conductor pipe; 5,000 lbs. copper and brass gasoline tubing; 25,000 lbs, brass and copper wire; 20,000 lbs. Tobin bronze; 10,000 lbs. nickel silver; 5,000 lbs. phoshor bronze; all merchandise made by the American Brass Company.

METAL STOCK MARKET QUOTATIONS

	Par	Bid	Asked
Aluminium Company of America	..	77	80
American Hardware Corporation	$100	78	81
Anaconda Copper	50	43⅞	44
Bristol Brass	25	8	10
International Nickel, com.	25	61	61½
International Nickel, pfd.	100	107	110
International Silver, com.	100	164	165
International Silver, pfd.	100	120	121½
National Enameling & Stamping	100	32	33
National Enameling & Stamping, pfd.	100	91½	92½
National Lead Company, com.	100	98	99
National Lead Company, pfd.....	100	132	132½
New Jersey Zinc	100	179	181
Rome Brass & Copper	100	132	142
Scovill Manufacturing Company	...	53½	55½
Yale & Towne Mfg. Company	...	79	80

Corrected by J. K. Rice, Jr., Co., 120 Broadway, New York.

Review of the Wrought Metal Business

Written for The Metal Industry by J. J. WHITEHEAD, President of the Whitehead Metal Products Company of New York, Inc.

JULY 1, 1927

A slight flurry in the ingot copper market in the early part of June, which seemed to indicate a tendency toward higher prices, was responsible for some activity in the placing of contracts for brass and copper fabricated materials, such as rods, sheets, tubes and wire. This activity was short lived, however, as it very quickly became evident that there would be no material advance in price of these commodities, and the copper market itself declined to lower levels. Since then and throughout the rest of the month the business has been done on the same hand to mouth basis that has been the rule for some time, and toward the end of the month with a further decline in the published prices of all the fabricated non-ferrous metals a period of dullness seems to have settled over the whole industry.

Complaints are heard from many of the mills that they are not running full in all their departments, and while the condition is regarded to be only temporary, it seems to be a fact that there is not enough business to keep everyone going at full production capacity. The general business situation seems to be responsible for this condition to a very large degree, but in addition to this buyers are scared off by the unsteady conditions of the raw copper market and the feeling that there may be lower prices quoted than those which are now the rule.

There were no outstanding items of interest developed during the month other than the change in ownership of one of the largest of the fabricating mills.

It is indicated that there is some curtailment of activity on the part of the manufacturers of refrigerating machines, especially the household refrigerators and ice cream cabinets, and this of course has a noticeable effect on the business in sheet copper and seamless copper tube. There is no definite information at this time as to whether this curtailment is going to reach any serious proportions or run into a slump in this line, although there is some disappointment that the requirements from this branch of the consuming trade has not been as heavy as they were expected to be at this time.

In the line of white metal, such as Monel metal, nickel silver and nickel and copper alloys generally, business has been in fair volume. Some large orders were placed by railroad companies and car manufacturers for Monel metal for dining car galleys. One of the largest manufacturers of ice cream soda fountains in the country has put out a line of Monel metal trimmed fountains, and with these two outlets a considerable tonnage has been placed. Some of the textile mills are taking advantage of the temporary lull in business to revamp their plants and many new installations of Monel metal are being made in both the dye houses and bleaching plants of some of the largest mills.

Throughout the industry there is a certain amount of complaint regarding the situation as it is at the present, but there is no belief indicated that the condition will be a permanent one.

Rather, it is felt that there is just a temporary lull and that within a short time there will be a sufficient amount of activity to satisfy everyone.

Metal Market Review

Written for The Metal Industry by R. J. HOUSTON of D. Houston & Company, Metal Brokers, New York

JULY 1, 1927

COPPER

Changes in the copper situation were comparatively slight lately, so far as price variations were concerned, but the tendency was downward notwithstanding the low level at which the metal has been selling for many weeks. New demand was more or less irregular for both domestic and foreign account. The hesitant attitude of buyers was a feature, and the reduction in prices of finished products reflected sagging values all round. The position of the copper industry has also become less favorable owing to the large increase in surplus stocks during the month of May. Clearances for foreign countries, however, were heavy, but the present depressed state of the market and its background of excess production are painfully obvious. Under such circumstances low prices are bound to prevail, and the natural and logical course for the consumer is to adopt the policy of hand-to-mouth buying. The copper situation is considered in a rather critical state for some units and groups owing to low prices. But no permanent relief is possible until there is an orderly readjustment between production and consumption. The market closes steady at 12½ cents and in some cases 12⅝ cents is quoted.

ZINC

Zinc prices advanced somewhat last month on a better statistical position, higher prices for ore and less pressure to sell. The base price for zinc ore has risen to $40 @ $42 per ton, and opinion is expressed that higher prices are due for slab zinc. Interest on the part of consumers has been only fair, but better buying for stock replenishment is expected if the statistical situation warrants more confidence in the article. Stocks were increased during May 738 tons, being the smallest increase this year. Production in May amounted to 51,296 tons, but total shipments to domestic consumers and for export were 50,458 tons, thus absorbing almost the entire current output. Surplus stocks on June 1 amounted to 42,046 tons.

Quotations at present are 6.20c to 6.25c, East St. Louis, and 6.57½c to 6.60c New York basis.

TIN

There was a great deal of activity in the market for tin early in June, and large tonnages were traded in by dealers and consumers. Sales of spot Straits sold at 68 cents, and June delivery at 67¾c while July brought 66⅛c. There was an increase in world's visible supply of tin of 806 tons during May. Even with this increase total world supplies on June 1 were only 14,655 tons, as compared with 18,045 tons a year ago. There were active and dull periods during the month. Tin values are high, but the statistical position is strong enough to sustain market prices at a high range indefinitely. Recent shipments and arrivals however have been heavy. If visible supply is increased the market should reflect the fact. Present price of nearby Straits tin is quoted at 65¾c to 66¼c, market steady.

LEAD

There was a large volume of demand early in June from consumers and dealers. The leading producers continued to hold prices unchanged at 6.40c per pound, New York basis. Considerably higher prices were quoted in the outside market, but spot and future positions were obtainable by the consuming trade at inside quotations. The official price of 6.40c, New York delivery, has been in force since May 26th. The tone of market lately was called steady to firm, and producers were rather reluctant to sell late futures at prevailing prices. There has been some curtailment of output, but not enough to create a strong market rebound. Confidence in the lead market would soon develop on signs of real improvement in the statistical position.

There is a large outlet, and a brisker demand would soon strengthen market tendencies.

ALUMINUM

There is no pronounced change to record in the market for aluminium. Prices remain firm and unchanged at 26c for commercial ingot 99% plus, and 25c for Metallurgical 94-99% quality. Consumers appear to be buying as requirements develop. Buying for third and last quarter of the year should occur soon, and the outlook for consumption by automobile plants is looked forward to with encouragement. Aviation plans will call for increased tonnage by that industry. Stocks of imported aluminum recently amounted to 6,072,039 pounds. These stocks are smaller than they were at the beginning of the year, but much larger than they were a year ago.

ANTIMONY

The market for Antimony developed a downward tendency during the past month. There was a fair amount of buying in the first half of June, consumers and dealers on the basis of 12½c duty paid, deliveries extending over August and September. A slightly firmer tone developed later, but before the month ended the market became dull and easy at 12c duty paid for prompt delivery. Shipments from China were offered at 10c c. i. f. New York, being equal to 12c duty paid, for September and October delivery. Imports of antimony into the United States in the first four months of 1927 amounted to 10,539,887 pounds, as compared with 10,754,822 pounds in the corresponding period of 1926. The April imports were specially large with total arrivals of 3,681,883 pounds.

QUICKSILVER

A sharp decline in prices of quicksilver followed the recent strong tendency of this market. The price was carried down to $115 a flask recently, but a sudden rally lifted prices $5 per flask and established a quotation of $120 to $122. Consumption is good, and new demand is expected to keep the market firm.

PLATINUM

Platinum prices have been weak lately, and offerings were made at early in June at $64 per ounce. There was continued liquidation by prominent interests, but present price of refined is quoted at $66 per ounce.

SILVER

During the past month silver has moved in a narrow range pending more definite developments at home and abroad. The present quotation of 56⅜c per ounce reflects the absence of any notable demand. Unsettled conditions in the Far East makes it improbable that China and India launch a strong buying movement in the immediate future. Supplies at Shanghai, China, on June 9th were 126,300,000 taels. China was a seller lately and bullion price declined to 56⅛c recently. United States production of silver for the first five months of 1927 amounted to 24,761,000 ounces. Silver producers continue efforts to have the Government purchase, 14,589,730 ounces of silver under terms of Pittman Silver Act of 1919 at one dollar an ounce.

OLD METALS

Notwithstanding the declining tendency of virgin metals domestic prices of old brass and copper were fairly firm. The trade are not inclined to revise material in stock downward below the present levels as current prices are considered attractive for either domestic demand or export. Requirements, however, do not broaden during a period of uncertainty. Dealers quote following as basis of purchases. Heavy copper, 10½c @ 10¾c, light copper, 9c @ 9¼c, heavy brass, 6½c @ 6¾c, heavy lead, 5¼c @ 5½c, old zinc, 3¾c @ 4c, and aluminium clippings, 18½c @ 19c.

Daily Metal Prices for the Month of June, 1927

Record of Daily, Highest, Lowest and Average Prices and the Customs Duties

	1	2	3	6	7	8	9	10	*13	14	15	16
Copper (f. o. b. Ref) c/lb. Duty Free												
Lake (Delivered)	12.75	12.875	12.875	12.875	12.875	12.875	12.875	12.75	.....	12.75	12.75	12.625
Electrolytic	12.50	12.50	12.625	12.625	12.625	12.625	12.625	12.50	.....	12.50	12.50	12.375
Casting	12.375	12.50	12.50	12.50	12.50	12.50	12.50	12.50	.....	12.50	12.50	12.375
Zinc (f. o. b. St. L.) c/lb. Duty 1¼c/lb.												
Prime Western	6.15	6.20	6.25	6.25	6.30	6.30	6.25	6.25	.....	6.275	6.25	6.25
Brass Special	6.20	6.25	6.30	6.30	6.35	6.35	6.30	6.30	.....	6.325	6.30	6.30
Tin (f. o. b. N. Y.) c/lb. Duty Free												
Straits	67.25	68	68.25	68	68	67.75	67.875	67.875	.....	67.75	67.625	67.75
Pig 99%	63.375	63.625	64.00	64	64	64	64	64	.....	64	63.625	64
Lead (f. o. b. St. L.) c/lb. Duty 2¼ c/lb.	6.10	6.15	6.20	6.20	6.25	6.25	6.225	6.20	.....	6.175	6.15	6.125
Aluminum c/lb. Duty 5c/lb.	26	26	26	26	26	26	26	26	.....	26	26	26
Nickel c/lb. Duty 3c/lb.												
Ingot	35	36	35	35	35	35	35	35	.....	35	35	35
Shot	36	36	36	36	36	36	36	36	.....	36	36	36
Electrolytic	39	39	39	39	39	39	39	39	.....	39	39	39
Antimony (J & Ch) c/lb. Duty 2c/lb.	12.875	12.625	12.625	12.50	12.625	12.50	12.375	12.25	.....	12.375	12.375	12.375
Silver c/oz. Troy Duty Free	57	57.25	57.50	57.125	56.75	56.75	57.125	57	.....	57	57	56.875
Platinum $/oz. Troy Duty Free	64	64	64	64	65	66	66	66	.....	66	66	66

	17	20	21	22	23	24	27	28	29	30	High	Low	Aver.
Copper (f. o. b. Ref) c/lb. Duty Free.													
Lake (Delivered)	12.625	12.625	12.625	12.625	12.625	12.625	12.625	12.625	12.625	12.625	12.875	12.625	12.720
Electrolytic	12.375	12.375	12.375	12.375	12.375	12.375	12.375	12.375	12.375	12.375	12.625	12.375	12.464
Casting	12.375	12.275	12.375	12.375	12.375	12.375	12.375	12.375	12.375	12.375	12.50	12.375	12.429
Zinc (f. o. b. St. L.) c/lb. Duty 1¼ c/lb.													
Prime Western	6.25	6.225	6.20	6.175	6.20	6.20	6.25	6.25	6.25	6.175	6.30	6.15	6.233
Brass Special	6.30	6.275	6.25	6.225	6.25	6.25	6.30	6.30	6.30	6.225	6.35	6.20	6.283
Tin (f. o. b. N. Y.) c/lb. Duty Free													
Straits	67.875	67.625	67.375	67.875	67.25	67.00	66.50	66.00	66.25	66.00	68.25	66.00	67.423
Pig 99%	64.125	64.25	64.125	64.875	65.125	64.75	65.25	64.625	64.625	64.75	65.25	63.375	64.244
Lead (f. o. b. St. L.) c/lb. Duty 2¼ c lb.	6.125	6.15	6.15	6.15	6.15	6.15	6.175	6.15	6.15	6.15	6.25	6.10	6.168
Aluminum c/lb. Duty 5c/lb.	26	26	26	26	26	26	26	26	26	26	26	26	26
Nickel c/lb. Duty 3c/lb.													
Ingot	35	35	35	35	35	35	35	35	35	35	35	35	35
Shot	36	36	36	36	36	36	36	36	36	36	36	36	36
Electrolytic	39	39	39	39	39	39	39	39	39	39	39	39	39
Antimony (J & Ch) c/lb. Duty 2c/lb.	12.625	12.625	12.625	12.375	12.50	12.25	12	12	12	12	12.875	12	12.405
Silver c/oz. Troy Duty Free	56.50	56.25	56.25	56.50	56.125	56.50	56.75	56.375	56.625	56.50	57.50	56.125	56.75
Platinum $/oz. Troy Duty Free	66	66	66	66	66	66	66	66	66	66	69	64	65.810

* Holiday.

Metal Prices, July 5, 1927

NEW METALS

Copper: Lake, 12.625. Electrolytic, 12.375. Casting, 12.375.
Zinc: Prime Western, 6.15. Brass Special, 6.20.
Tin: Straits, 64.50. Pig, 99%, 63.125.
Lead: 6.00. Aluminum, 26.00. Antimony, 12.00.
Nickel: Ingot, 35. Shot, 36. Elec., 39. Pellets, 40.
Quicksilver: flask, 75 lbs. $121.00. Bismuth, $2.20 to $2.25.
Cadmium, 60. Cobalt, 97%, $2.60. Silver, oz., Troy, 56.125.
Gold: oz., Troy, $20.67. **Platinum,** oz., Troy, $66.00.

INGOT METALS AND ALLOYS

Brass Ingots, Yellow	9¾ to 10¾
Brass Ingots, Red	11½ to 13
Bronze Ingots	12½ to 13½
Casting Aluminum Alloys	21 to 24
Manganese Bronze Castings	23 to 40
Manganese Bronze Ingots	12 to 16
Manganese Bronze Forging	32 to 40
Manganese Copper, 30%	25 to 35
Monel Metal Shot	28
Monel Metal Blocks	32
Parsons Manganese Bronze Ingots	18¼ to 19¾
Phosphor Bronze	13½ to 15
Phosphor Copper, guaranteed 15%	18 to 22
Phosphor Copper, guaranteed, 10%	17 to 21
Phosphor Tin, guaranteed 5%	75 to 80
Phosphor Tin, no guarantee	70 to 80
Silicon Copper, 10%.....according to quantity.....	28 to 32

OLD METALS

Buying Prices		Selling Prices
11¼ to 11¾	Heavy Cut Copper	12¾ to 13¼
10¾ to 11¼	Copper Wire	12¼ to 12½
9¼ to 9¾	Light Copper	10¾ to 11
9 to 9½	Heavy Machine Composition	10 to 10¼
7½ to 7¾	Heavy Brass	8¾ to 9
6¼ to 6½	Light Brass	7½ to 7¾
7¼ to 7½	No. 1 Yellow Brass Turnings	8¾ to 9¼
8¼ to 8¾	No. 1 Composition Turnings	9¾ to 10¼
6¼ to 6½	Heavy Lead	7¼ to 7½
4¼ to 4½	Zinc Scrap	5¼ to 5¾
10 to 11	Scrap Aluminum Turnings	13 to 15
14½ to 15	Scrap Aluminum, cast alloyed	18 to 19
20 to 20½	Scrap Aluminum, sheet (new)	22½ to 23
38 to 40	No. 1 Pewter	42 to 44
12	Old Nickel Anodes	14
18	Old Nickel	20

Wrought Metals and Alloys

COPPER SHEET

Mill shipments (hot rolled)	20¼c. to 21¼c. net base
From stock	21¼c. to 22¼c. net base

BARE COPPER WIRE

14½c. to 14¾c. net base, in carload lots.

COPPER SEAMLESS TUBING

23¼c. to 24¼c. net base.

SOLDERING COPPERS

300 lbs. and over in one order.....19¾c. net base
100 lbs. to 200 lbs. in one order.....20¼c. net base

ZINC SHEET

Duty sheet, 15% — Cents per lb.
Carload lots, standard sizes and gauges, at mill, less 8 per cent discount ..... 9.75 net base
Casks, jobbers' price.....10.25 net base
Open Casks, jobbers' price.....10.50 to 11.00 net base

ALUMINUM SHEET AND COIL

Aluminum sheet, 18 ga., base price	38c.
Aluminum coils, 24 ga., base price	34.7c.
Foreign	40c.

ROLLED NICKEL SHEET AND ROD

Net Base Prices

Cold Drawn Rods..... 53c. Cold Rolled Sheet..... 60c.
Hot Rolled Rods..... 45c. Full Finish Sheet..... 52c.

BLOCK TIN SHEET

Block Tin Sheet—18" wide or less. No. 26 B. & S. Gauge or thicker, 100 lbs. or more 10½c. over Pig Tin; 50 to 100 lbs., 15c. over; 25 to 50 lbs., 17c. over; less than 25 lbs., 25c. over.

SILVER SHEET

Rolled sterling silver 57¾ to 59¾.

BRASS MATERIAL—MILL SHIPMENTS

In effect June 22, 1927
To customers who buy 5,000 lbs. or more in one order.

	Net base per lb. High Brass	Low Brass	Bronze
Sheet	$0.17½	$0.19	$0.21
Wire	.18	.19½	.21½
Rod	.15¼	.19¾	.21¾
Brazed tubing	.25½	....	.30¾
Open seam tubing	.25½	....	.30¾
Angles and channels	.28½	....	.33¾

For less than 5,000 lbs. add 1c. per lb. to above prices.

BRASS SEAMLESS TUBING

22⅜c. to 23⅛c. net base.

TOBIN BRONZE AND MUNTZ METAL

Tobin Bronze Rod	19½c. net base
Muntz or Yellow Metal Sheathing (14"x48")	17½c. net base
Muntz or Yellow Rectangular sheet other Sheathing	18½c. net base
Muntz or Yellow Metal Rod	15½c. net base

Above are for 100 lbs. or more in one order.

NICKEL SILVER (NICKELENE)

Net Base Prices

Grade "A" Sheet Metal		Wire and Rod	
10% Quality	25⅜c.	10% Quality	28⅜c.
15% "	26⅞c.	15% "	32⅛c.
18% "	28⅛c.	18% "	35⅜c.

MONEL METAL SHEET AND ROD

Hot Rolled Rods (base) 35 Full Finished Sheets (base) 42
Cold Drawn Rods (base) 43 Cold Rolled Sheets (base) 50

BRITANNIA METAL SHEET

No. 1 Britannia—18" wide or less, No. 26 B. & S. Gauge or thicker, 500 lbs. or over, 8c. over N. Y. tin price; 100 lbs. to 500 lbs., 10c. over; 50 to 100 lbs., 15c. over; 25 to 50 lbs., 20c. over; less than 25 lbs., 25c. over. Prices f. o. b. mill.

Supply Prices, July 5, 1927

ANODES

Copper:	Cast	19½c. per lb.
	Rolled	18⅞c per lb.
	Electrolytic	19⅝c. per lb.
Brass:	Cast	18½c. per lb.
	Rolled	18⅞c. per lb.
Zinc:	Cast	13c. per lb.
Nickel:	90-92%	45c. per lb.
	95-97%	47c. per lb.
	99%	49c. per lb.

Silver: Rolled silver anodes .999 fine are quoted from 59½c. to 61½c. Troy ounce, depending upon quantity purchase.

FELT POLISHING WHEELS WHITE SPANISH

Diameter	Thickness	Under 100 lbs.	100 to 200 lbs.	Over 200 lbs.
10-12-14 & 16"	1" to 3"	$3.00/lb.	$2.75/lb.	$2.65/lb.
6-8 & over 16	1 to 3	3.10	2.85	2.75
6 to 24	Under ½	4.25	4.00	3.90
6 to 24	½ to 1	4.00	3.75	3.65
6 to 24	Over 3	3.40	3.15	3.05
4 up to 6	¼ to 3	4.85	4.85	4.85
4 up to 6	Over 3	5.25	5.25	5.25
Under 4	¼ to 3	5.45	5.45	5.45
Under 4	Over 3	5.85	5.85	5.85

Grey Mexican Wheel deduct 10c per lb. from White Spanish prices.

COTTON BUFFS

Full Disc Open buffs, per 100 sections.

12" 20 ply 64/68 Unbleached	$28.30-28.85
14" 20 ply 64/68 Unbleached	35.90-36.45
12" 20 ply 80/92 Unbleached	31.25
14" 20 ply 80/92 Unbleached	42.40
12" 20 ply 84/92 Unbleached	35.40-40.50
14" 20 ply 84/92 Unbleached	48.50-54.20
12" 20 ply 80/84 Unbleached	36.50-37.15
14" 20 ply 80/84 Unbleached	49.15-50.40

Sewed Pieced Buffs, per lb., bleached 60–75c.

CHEMICALS

These are manufacturers' quantity prices and based on delivery from New York City.

Acetone	lb.	.11–.16
Acid—Boric (Boracic) Crystals	lb.	.12
Chromic	lb.	.39
Hydrochloric (Muriatic) Tech., 20°, Carboys	lb.	.02
Hydrochloric, C. P., 20 deg., carboys	lb.	.06
Hydrofluoric, 30%, bbls	lb.	.08
Nitric, 36 deg., carboys	lb.	.06
Nitric, 42 deg., carboys	lb.	.07
Sulphuric, 66 deg., carboys	lb.	.02
Alcohol—Butyl	lb.	17¼-21¾
Denatured, bbls.	gal.	.55
Alum—Lump, Barrels	lb.	.03¼
Powdered, Barrels	lb.	.042
Aluminum sulphate, commercial tech	lb.	.02⅜
Aluminum chloride solution in carboys	lb.	.06½
Ammonium—Sulphate, tech. bbls	lb.	.03¾
Sulphocyanide	lb.	.65
Arsenic, white, kegs	lb.	.05
Asphaltum	lb.	.35
Benzol, pure	gal.	.60
Borax Crystals (Sodium Biborate), bbls	lb.	.04½
Calcium Carbonate (Precipitated Chalk)	lb.	.04
Carbon Bisulphide, Drums	lb.	.06
Chrome Green, bbls	lb.	.29
Chromic Sulphate	lb.	.37
Copper—Acetate (Verdegris)	lb.	.37
Carbonate, bbls.	lb.	.17
Cyanide (100 lb. kegs)	lb.	.50
Sulphate, bbls.	lb.	.05½
Cream of Tartar Crystals (Potassium bitartrate)	lb.	.27
Crocus	lb.	.15
Dextrin	lb.	.05–.08
Emery Flour	lb.	.06
Flint, powdered	ton	$30.00
Flour-spar (Calcic flouride)	ton	$75.00
Fusel Oil	gal.	$4.45
Gold Chloride	oz.	$14.00
Gum—Sandarac	lb.	.26
Shellac	lb.	.59-.61
Iron, Sulphate (Copperas), bbl	lb.	.01½
Lead Acetate (Sugar of Lead)	lb.	.13¾
Yellow Oxide (Litharge)	lb.	.12½
Mercury Bichloride (Corrosive Sublimate)	lb.	$1.58
Nickel—Carbonate dry, bbls	lb.	.29
Chloride, bbls.	lb.	.17–.18
Salts, single 300 lb. bbls	lb.	.10½
Salts, double 425 lb. bbls	lb.	.10
Paraffin	lb.	.05–.06
Phosphorus—Duty free, according to quantity		.35–.40
Potash, Caustic Electrolytic 88-92% broken, drums	lb.	.09¼
Potassium Bichromate, casks (crystals)	lb.	.08½
Carbonate, 96-98%	lb.	.07
Cyanide, 165 lb. cases, 94-96%	lb.	.57½
Pumice, ground, bbls.	lb.	.02½
Quartz, powdered	ton	$30.00
Rosin, bbls.	lb.	.04½
Rouge, nickel, 100 lb. lots	lb.	.25
Silver and Gold	lb.	.65
Sal Ammoniac (Ammonium Chloride) in casks	lb.	.06
Silver Chloride, dry	oz.	.86
Cyanide (fluctuating)	oz.	.60
Nitrate, 100 ounce lots	oz.	.40½
Soda Ash, 58%, bbls	lb.	.02½
Sodium—Cyanide, 96 to 98%, 100 lbs.	lb.	.20
Hyposulphite, kegs	lb.	.04
Nitrate, tech., bbls.	lb.	.04¾
Phosphate, tech., bbls	lb.	.03¾
Silicate (Water Glass), bbls	lb.	.02
Sulpho Cyanide	lb.	.45
Sulphur (Brimstone), bbls	lb.	.02
Tin Chloride, 100 lb. kegs	lb.	.47
Tripoli, Powdered	lb.	.03
Wax—Bees, white ref. bleached	lb.	.60
Yellow, No. 1	lb.	.45
Whiting, Bolted	lb.	02½-.06
Zinc, Carbonate, bbls	lb.	.11–.12
Chloride, casks	lb.	.06¾
Cyanide (100 lb. kegs)	lb.	.41
Sulphate, bbls.	lb.	.03½